



FRIDAY, MARCH 28.

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Contributions.

Ventilation vs. Refrigeration.

CAMDEN, N. J., March 24, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I do not propose to recognize *nom de plume* attacks on the merits of my ventilation proposition, much less to transport the matter into funny articles; and, candidly, he who hid under the *nom de plume* of "Refrigerator" in your last week's issue, to principally beg the question, I now recognize only to "pin" his one one pertinent assertion—to wit: that "it is only by refrigeration that the heat, sweat, etc., can be removed from fruit!" Does not everybody know that the heat, sweat, etc., are removed to the extreme degree by ventilation, and are more rapidly and thoroughly removed by adding heat (instead of ice) to perpetuate the keeping of fruits, etc., in rendering them "dried fruits?"

If "Refrigerator" will look seriously into the subject, he should be able to realize that if the application of extreme ventilation and heat prevents decay indefinitely by the extreme removal of the fruit gases, etc., then an intermediate degree of these preserving influences (ventilation, and heat, if you please), only enough to prevent mold and decay, not enough, of course, to approach the dried-fruit status, but merely "a step in that direction"—the proper application of ventilation—may prove a happy step, against the present ruinous deterioration of many products in transportation, by the prompt removal of those destructive factors (the noxious fruit gases, sweat, etc.)

What kept these oranges so long that came to the Gazette office, as "Refrigerator" instances, but the ventilation they had there? Certainly not refrigeration. Perhaps he will say it was the effects of refrigeration. But he should know that will not explain it, because it is very well known that refrigerated fruit will not keep long in bulk after removal to the atmosphere, only when it is scattered out and thereby ventilated.

The proposition of my "theory is based on," and is the outcrop of, six years' experience in handling perishable fruits, etc., from Florida, Mississippi, California and intermediate sections, and therefore it is rather more than "merely a theory."

R. M. PANCOAST, C. E.

Wilmerding Employes' Homes.

PITTSBURGH, PA., March 17, 1890.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Replying to your request for a statement of how I reached the results given in a circular recently issued by the Westinghouse Air Brake Company, I would state first, by way of explanation, that the company has advanced the capital to purchase the lots and erect the houses at Wilmerding with no idea of profit in the transaction, but simply with a view to benefiting its employes by providing them a way to secure homes without risk, and enabling them to pay for the same out of their monthly savings. The venture to the Air Brake Company, therefore, is calculated upon a basis of five per centum only, with an addition of five cents per month on each \$100, to cover cost of clerical work, collections, etc., etc.

To pay off \$100 in ten years with interest at five per cent. requires yearly payments of \$13, or monthly payments of \$1.09. At six per cent. these amounts become respectively \$13.00 per year, and \$1.14 per month. From this it will be noticed that the allowance of five cents per \$100 for expenses is equivalent to an additional one per centum.

Turning to the life insurance feature, I hand you a detailed calculation showing how the rate of 80 cents per month, or \$9.60 per year for \$1,000, is obtained at the age of 35. The margin of \$4.00 gained by the company in 10 years on each \$1,000 comes

through the use of an even number, and only amounts to about 3 cents per month to the insured. As shown in the statement, the amount of insurance decreases in like manner with the principal debt, to wit., one-tenth each year, and the premium paid by the Air Brake Company to the insurance company is proportioned as usual to the amount of the policy; most insurance companies refusing to make a "level premium" on this class of business.

The feature of equal payments throughout the entire period being very desirable in my eyes, I have averaged the rates so as to secure the desired end, and at the same time reimburse the company for the advances made to pay premiums over and above the amounts received during the first few years. The fact that the company holds the title to the property purchased by the insured, and other points of advantage needless to mention, is sufficient guarantee against loss.

In the calculations made to determine the amount of each installment, and also of each insurance payment, no account is taken of the fact that these payments are made monthly instead of at the end of each year, as indicated. The advantage gained by this method of payment theoretically is about one-half of one per cent.; but practically it amounts to little unless in case of regular loan associations, banks or other concerns having facilities for reinvesting promptly. As far as our company is concerned, therefore, it is ignored.

To recapitulate briefly: The amount of a monthly installment due from a purchaser aged 35 years, on a debt of \$1,000, payable in ten years, is as follows:

1-120 of principal and interest at 5 per cent. on \$100.	
\$1.09 on \$1,000.....	\$10.90
Add for expenses.....	50
Insurance.....	80
	\$12.20

On a debt of \$3,550 this would amount to \$43.31.

JOHN F. MILLER.

New First-Class Carriages for New South Wales.

A new and most comfortable style of first-class carriage is now being introduced on the New South Wales railroad, the first vehicle of this type having just been completed at the Clyde Works of Messrs. Hudson Bros., Limited. In all 34 of these carriages are now under construction, and in different stages of progress in the Colony.

The carriage is specially adapted for the comfort and convenience of passengers on long journeys, and with this object in view the latest type used on the express trains between England and Scotland has been followed, with modifications to adapt it to our climate and the heavy gradients and sharp curves on the New South Wales lines. The main feature of the carriage is that no less than four separate compartments or small rooms are provided, fitted up completely with lavatories and toilet accommodation. The main portion of the carriage is occupied by four full-size passenger compartments, each considerably larger than those usually provided. Some of the compartments are upholstered in cloth, giving a more comfortable, because less slippery, seat than leather, and these will doubtless be appreciated, especially in cool weather. The majority, however, of the compartments, including those for smoking, are upholstered in leather. The seats are provided with elbow rests and arm slings—the need of which in the majority of our present carriages is greatly felt by the weary traveler on a long journey. The ends of the carriages are arranged as coupés, accommodating four passengers, who have a view in the direction in which the train is running, and are provided with a small table. These coupés not only give the passengers a better view of the scenery, but will enable a small party to obtain a reserved compartment at a moderate cost. Efficient ventilation, without draughts, is, it is believed, secured by the use of the Anderson ventilator. The carriage is lit with gas, distilled from shale, and carried in a compressed form in reservoirs under the carriage. The lamps are of improved form, giving a good steady light, without any tendency to blow out on a windy night.

The carriages are painted externally a deep red brown, the moldings being picked out with yellow lines. The curved form of the moldings, in combination with the effective coloring, gives the carriage a very handsome appearance, and as the color has also been chosen for its wearing qualities, it is believed that this handsome appearance can be maintained at a moderate cost.

The details of construction have been specially devised to guard the carriage against the destructive influence of weather and the expansion and contraction caused by alterations of temperature. The under frame and the main portion of the bogies, where strength is the great requisite, are made of iron and steel bars and plates, riveted together, as being stronger than timber and far less liable to decay and alteration of form. The exterior panels of the body are of papier-mâché, which is not only a good non-conductor of heat and sound, but is little affected by the sun, which warps and often prematurely destroys panels made of wood. The interior moldings, etc., are of Colonial cedar, French polished, while the ventilator slides and blind slats are of Huon pine, the ivory white of which contrasts well with the dark, rich color of the polished cedar.

The roof is double, with a closed air space between the two thicknesses of boarding. The interior of the roof is covered with Lincrusta Walton of a quiet but handsome

pattern, the silvery appearance of which not only contrasts well with the prevailing red brown of the carriages, but also assists materially in enlivening the carriage at night, by reflecting and throwing down the light. Careful provision is further made for night travelers, for not only do the arm rests fold up with a spring to enable travelers to lie down at full length, but a species of night cap can be applied to the lamp, obscuring it, and keeping the compartment in darkness until the light is required again. The night-cap works on a spring hinge, and is very easily manipulated.

The appearance of the interior of each compartment is materially enhanced by a set of photographs of New South Wales scenery, placed just under the parcel netting. Few of us are aware of the many beautiful waterfalls, caves, mountains and forests, which express trains virtually place at our doors, and a study of the fifty different views placed in each carriage will doubtless do much to encourage the search for the picturesque.

The carriages measure 46 ft. long and 8 ft. 6 in. broad over the body, and weigh about 21.5 tons, an appreciable portion of which is the water required for the supply of the lavatories and water closets. The wheels are of the "solid wrought iron spoke" description; the tires are of the best crucible steel, and are secured to the wheels by the Mansell fastening. The axles are also of the best crucible steel. The carriages are equipped with the Westinghouse brake actuating cast-iron brake blocks on each wheel. An independent semi-elliptic spring is provided, directly above each axle box, which is considered the safest and most durable arrangement, though somewhat more expensive than the usual form. The easy riding of the carriage is further secured by means of the usual swing bolsters carried by triple elliptic springs. Any jar or vibration is further eliminated by interposing the latest form of "India rubber body blocks" between the body of the carriage and the underframe. This combination of the best features in the practice of English and American engineers should certainly go far to secure an easy and quiet riding carriage.

Each compartment is provided with an electric alarm, giving communication with the guard in case of emergency.

It will be seen from the foregoing description that both the comfort and safety of passengers have been carefully studied, and there can be no doubt that the many new and improved features introduced will render these carriages highly popular with passengers.

An equivalent number of second-class carriages and brake vans are also under construction, and as all the carriages are of precisely similar length, interchangeable in the working parts and of uniform external appearance, all our principal express and long-journey trains will soon present a uniform and handsome appearance.

SYDNEY, New South Wales, Feb. 19, 1890.

High-Speed Indicator Cards—Worsdell Compound Locomotive.

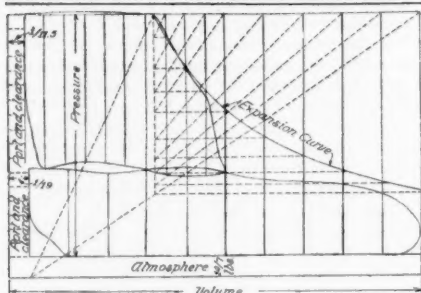
When examining indicator cards from locomotives, probably the first fact on the face of the card that is sought for by the experienced engineer is the speed. It is by this that the value of the card, as indicative of the capacity of the engine for heavy express work, is judged. If the card is full in form and the speed high, there is much ground for belief that the engine has considerable capacity at high speed; but if the speed is only moderate and the card shows a small area and long drawn-out form, not much is to be expected from the locomotive for express work with a heavy load, even while it might be satisfactory at starting and at lower speeds. Therefore, as the indicator cards herewith show great capacity at extraordinary speeds, they will be of interest to all who are connected with the development of locomotives.

The cards are exact reproductions of a blue print sent us by Mr. T. W. Worsdell, Locomotive Superintendent of the North Eastern Railway, England, and were taken from one of the latest compound locomotives on that road. The cylinders of the locomotive are 20 and 28 in. in diameter and 24 in. stroke. The driving wheels are 7 ft. 7½ in. diameter. The total weight of the engine, tender and train was 695,000 lbs. The run was between Newcastle and Berwick on Jan. 10 and 20 of this year. The scale of the indicator springs used is 50 lbs. per inch for the low pressure and 80 lbs. per inch for the high pressure. All the particulars of the cards that were sent us appear in the table herewith. The locomotive has inside cylinders working upon a single pair of driving wheels. The cylinders are placed one somewhat higher than the other in order to bring them between the frames. Mr. Worsdell writes as follows:

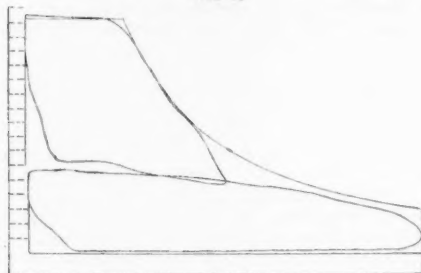
"You will observe that there are two sets taken at different times, showing a difference of distribution of horse power between the high and low pressure in each case. This can easily be arranged for either cylinder by a very slight alteration in the valve; but we always give about 10 per cent. more admission to the low-pressure cylinder than to the high, and we use only one reversing lever.

"You will see that one of the sets of diagrams was taken at 86 miles per hour, the engine running perfectly steadily at that speed, but of course, at such speeds, the back pressure begins to tell."

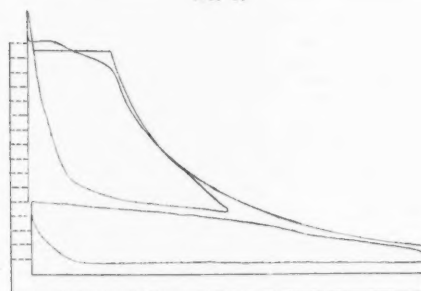
The cards are arranged side by side, those on the left being the combined cards made up from those on the



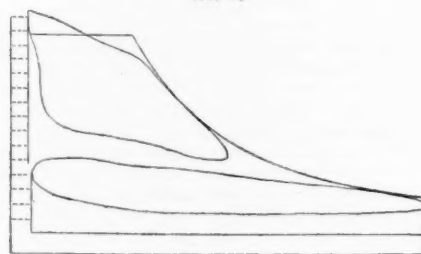
No. 1.



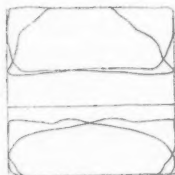
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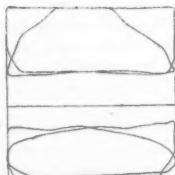
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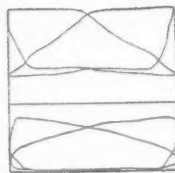
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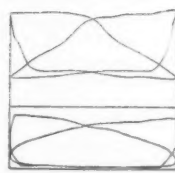
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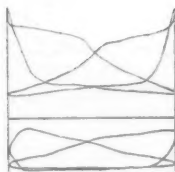
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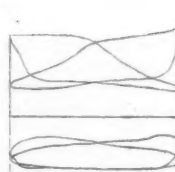
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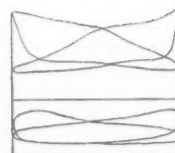
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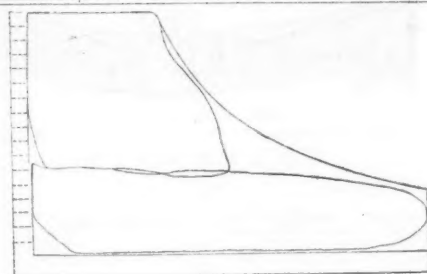
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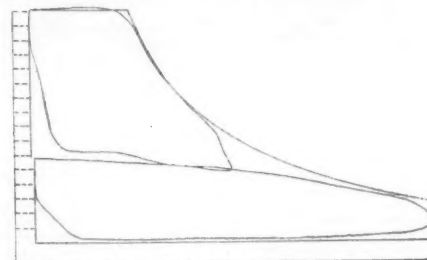
No. 6.



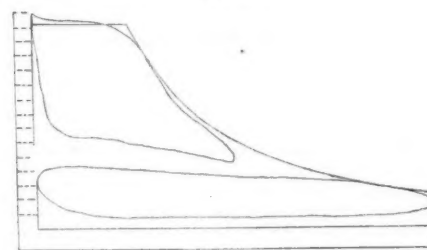
No. 7.



No. 2.



No. 4.



No. 6.

INDICATOR DIAGRAMS—WORSDELL'S LATEST HIGH SPEED COMPOUND LOCOMOTIVE.

NORTHEASTERN RAILWAY, ENGLAND.

DATA RELATIVE TO INDICATOR DIAGRAMS TAKEN FROM HIGH-SPEED COMPOUND LOCOMOTIVE, NORTH EASTERN RAILWAY, ENGLAND.

Number of card.	Cut-off h. p. cyl. in per cent. of stroke.	Cut-off l. p. cyl.	Speed — miles per hour.	Boiler pressure.	Mean effective pressure h. p. cyl.	Mean effective pressure l. p. cyl.	Mean back pressure h. p. cyl.	Indicated horse power h. p. cyl.	Indicated horse power l. p. cyl.	Total horse power.	Grade.	Lead of valve—full gear—h. p. cyl.	Inside clearance of valve each side h. p. cyl.	Lead of valve—full gear—l. p. cyl.	Inside clearance of valve, each side, l. p. cyl.
1.	63	78	5	175	92.7	51.5	62.5	65.0	70.8	135.8	1 in 190, up.	3/4	3/8	1 1/2	3/4
2.	63	78	17	180	94.25	45.9	56.75	224	214	438	1 in 170, up.	3/4	3/8	1 1/2	3/4
3.	50	68	23	175	72.4	42.0	60.75	233	265	498	1 in 200, up.	3/4	3/8	1 1/2	3/4
4.	50	68	30	175	69.3	41.0	62.25	291.5	338.1	629.6	1 in 461, up.	3/4	3/8	1 1/2	3/4
5.	40	62.5	50	180	46	24.75	59.6	322	339.8	661.8	1 in 275, up.	3/4	3/8	1 1/2	3/4
6.	47	67	75	175	52	24	62	546.7	494.7	1041.4	Level.	3/4	3/8	1 1/2	3/4
7.	53	70	86	170	45.68	21.92	63.4	550.6	518	1068.6	Level.	3/4	3/8	1 1/2	3/4

right. The numbers show which cards as taken correspond to the combined cards. The method of construction of the combined cards is shown in card No. 1 by dotted lines. The divisions at the left of the combined cards correspond to variations in steam pressure of 10 lbs. per square inch. The full lines on these cards show the theoretical card corresponding to the actual cut-off and pressure.

Comment on these diagrams will be found in the editorial column.

The Rotary Snow Plow.

This machine, called by the makers the Rotary Steam Snow Shovel, has been frequently illustrated, in its various stages of development, in the *Railroad Gazette*. As first constructed in Canada, the machine was shown by us in 1884, and the following year we showed the first one built in the United States. In 1886 many improvements were made, and later the efficiency and durability of the machine were much increased by improvements in details, which have been frequently noted and illustrated in these pages.

In the last four winters the rotary has fully demonstrated its value to any road subject to heavy snows, and it is now pretty generally considered that some form of machine plow is a necessary part of the equipment of any road so situated. In recent winters it has often happened that the rotary has made to a road all the difference between regular operation and

frequent total interruption for days and even weeks, and the call for it is growing, notwithstanding two unprecedentedly open winters. Several are now building at the Grant Locomotive Works in Paterson.

The machines put out in the last half of last year were slightly changed in details from former ones. Perhaps the most important modification was in diminishing the flare and the projection of the hood. In the later machines this projects but little beyond the cutting wheel at its circumference, and a line drawn horizontally from one edge of the hood to the other, passing through the centre line of the wheel shaft would, at the middle, fall close to the face of the wheel. Therefore the snow is excavated well up to the vertical plane of the front of the hood. By these changes the liability of the machine to get jammed in a compact snow bank and stick fast is greatly diminished. In any ordinary snow the older form, with the greater projection and flare of the hood, would seldom have any difficulty of this sort; but in drifts such as are often found in the extreme Northwest and in the Sierras, where the snow has a weight and compactness seldom known in the eastern states, it has sometimes happened that the flanges of the hood could not penetrate the snow far enough to bring the knives into action. This will account for occasional reported failures of the older form of machine.

The last 17 rotaries sent out last year were of the improved form described. Those last built have still other improvements. It will be remembered that,

as constructed heretofore, the radial fan blades have been flat plates, standing at right angles to the plane of rotation of the wheel. In the new machine these fan blades are replaced by hollow cones, the base of the cone toward the circumference of the wheel. A portion of each cone toward the cutting blade is removed, so that as the snow is cut off it is delivered into the interior of the cones and then discharged by the centrifugal force, as before. By this arrangement snow will be kept from accumulating close to the shaft, where the angular velocity of the wheel is low. This form of construction of the fan is considerably more expensive than with the flat blades, but probably its efficiency will be greater. The hood and wheel are made of steel plate, very substantially braced.

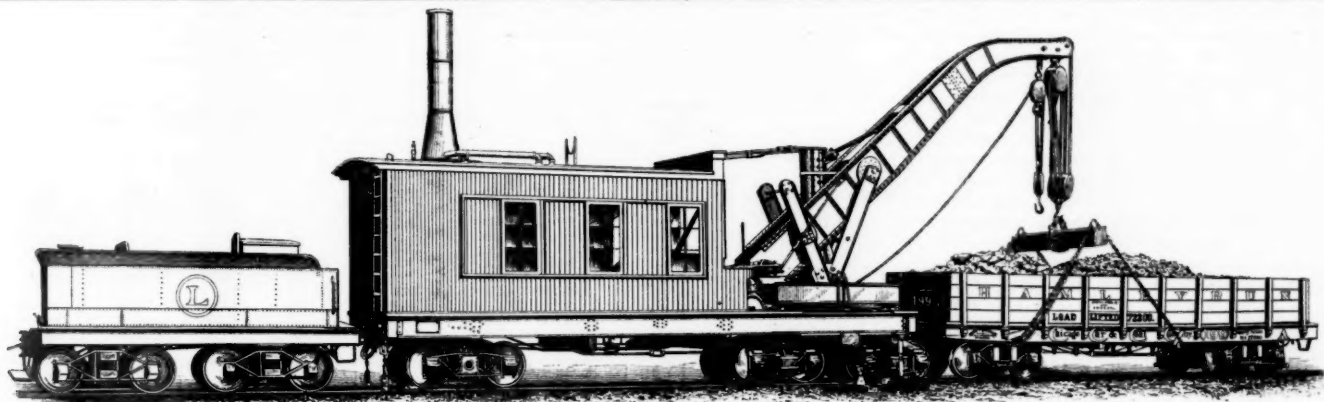
The criticism has been made that the rotary was deficient in boiler power. The machines now building have 61-in. boilers instead of the 52-in. heretofore used. The number of flues is increased and the dry pipe is taken out of the boiler, going from the dome directly down outside to the steam chests. The new boilers are straight; wagon top boilers have been used heretofore.

Some modifications have been made in the flanger. It is carried back of the front truck instead of forward of the second axle of that truck. It is suspended from the axle so that its position with relation to the rails varies only with the motion of the wheels. The flanger and ice breaker are raised and lowered together by compressed air, and are so carefully balanced that little power is required to handle them. The machine weighs in working order about 64 tons, and is carried on two four-wheeled trucks, with 5 in. x 9 in. journals. The Westinghouse air brake is used. The workmanship all through seems to be first rate, and the whole machine looks as if it was up to the heaviest work that can be put upon it.

Complaints have been made of breakages of the bevel gears in some of the machines sent out last year and the year before. These were due to minor defects in design, and new gears have been sent out to replace all that have been found to be, or might be expected to be, defective.

Thirty-five Ton Accident and Construction Crane.

Cranes of this type have been manufactured for some years past by the Industrial Works, of Bay City, Michigan. The engraving in this issue represents a machine of thirty-five tons lifting capacity, although



THIRTY-FIVE TON ACCIDENT AND CONSTRUCTION CRANE.

INDUSTRIAL WORKS, BAY CITY, MICH.—W. L. CLEMENTS, MECHANICAL ENGINEER.

all machines built before this were designed for from twenty to thirty tons capacity.

Such cranes are of great value in clearing off tracks after a wreck, and handling heavy sleepers and coaches. Loaded box cars and locomotives may be lifted bodily on to the track, and in cases where locomotives have been precipitated through defective bridges or open draw bridges, they have been lifted bodily to the track level.

In the construction of this crane steel and iron only are used. The frame of the car body is composed of six steel 15-in. eye beams, properly supplied with intermediate or cross sills securely riveted to the longitudinal sills.

From the examination of the jib or arm the method of attaching it to the crane post may be noticed. Two V struts attached to a collar revolving about the post support on trunnions the jib. By displacing the lower pin of these struts the jib may revolve into a horizontal position, which it assumes preparatory to transportation over the line. When in lifting position the jib bears firmly against the post at a point about 4 ft. from the deck of the car. It will thus be seen that, while one strut is in compression, the back member is in tension, and the attachment to the post is made at a low and advantageous point, preventing an excessive bending moment upon it.

The jib may be slewed, by a rack attached to its rear, to a position $22\frac{1}{2}$ degrees on either side of the centre of the track, or through a total arc of 45 degrees, the radius of the jib being 22 ft.

The jib is built up of steel plates and angles, curved to allow a high lift, and composed of two girders, each with four angles and connected by cover plates running nearly the entire length.

The machinery for hoisting the load and slewing the jib is within the cab occupying the rear portion of the car. The engine is horizontal, with double cylinders 9 in. x 12 in. The boiler, vertical, 52 in. diam., 8 ft. high. The gearing is of cast steel throughout, as are also the clutches. Hoisting may be done with two speeds, a fast speed for loads of 15,000 lbs., and a slow speed for loads of 70,000 lbs., the lifting in both cases being done by powerfully geared blocks, in the sheaves of which run manila rope $2\frac{1}{2}$ in. and 3 in. in diameter, such material being considered the lightest and most easily handled in the work for which it is used. Ropes from the blocks are wound through the power of the engine upon drums suitably arranged on the inside of the cab.

A suitable equipment of chains, timber and stone hooks, and tools for handling coaches and locomotives without injury to them, accompanies this machine. Its weight complete is 64 tons, distributed about equally over 12 wheels, the forward and heavier end being supported by an equalized truck, having a wheel base of about 16 ft. The car is equipped with the Westinghouse automatic air brake, and may be run in passenger trains, if necessary, at speeds of 40 miles an hour.

Machines of this type of 25 tons capacity are in use on the Chicago & Northwestern, Atchison, Topeka & Santa Fe, Denver & Rio Grande, Canada Southern, Chicago & Western Indiana, Union Pacific, and other roads, many of which have two or three in service.

The Industrial Works have at present four under construction—one for the Michigan Central (the second for that line), and one each for the Savannah, Florida & Western, the Rio Grande Western, and the Kansas City, Wyandotte & Northwestern.

Hall's Highway Crossing Signal.

We present herewith an illustration of the automatic, audible highway crossing signal made by the Hall Signal Co., of 50 Broadway, New York City, together with a perspective view of the track instrument and a smaller cut of the electro-magnet, which are the distinctive mechanisms of the apparatus. The general plan of signals of this sort is well known. A bell close to the crossing is, by means of a wire extending to a track instrument located at a sufficient distance, made to ring on the approach of a train, thereby warning wayfarers to keep off the track. A second track instrument, actu-

ated by the wheels of a train after the engine or foremost vehicle has passed the crossing, serves to withdraw the electric current from the bell circuit and stop the



Fig. 1.

The Hall Audible Signal for Highway Grade Crossings.

action of the signal. In the signal shown in the cut the bell is enclosed in a wire screen of circular form, which appears in the centre of the frame, supported upon the cast-iron post. The track instrument is of the well-known form long used by this company in connection with electric block and other signals, and is of the most substantial construction. The passing of a wheel over the lever closes the electric circuit inside the upright box or pillar, and a current is sent to the signal. This current goes to the horizontal electro-magnet shown in fig. 3, which is located near the bell. The presence of an electric current in the coils of this magnet attracts the armature and closes the contact points, which appear in the right-hand portion of

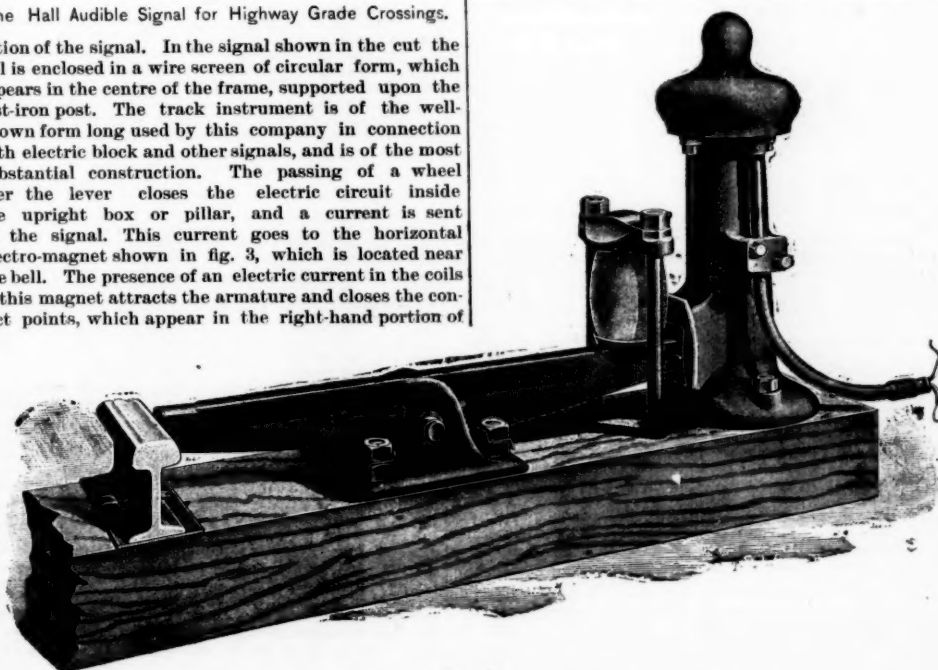


Fig. 2.

TRACK INSTRUMENT FOR THE HALL CROSSING SIGNAL

the figure. This serves to complete the local bell circuit through the wires extending upward and downward from the abovementioned contact points, and sets the bell ringing. When the armature of the horizontal magnet has been drawn forward the (horizontal) armature of the other (perpendicular) electro-magnet falls by gravity and locks the former in position. The bell then continues to ring as long as this armature is locked. On the passage of the train over the second track instrument, the perpendicular electro-magnet is vitalized, which draws up its armature and unlocks the armature of the other. The horizontal rod by which the local circuit is closed is then drawn back by the spring at its end, and the bell ceases ringing.

These signals have been used on the New York, New Haven & Hartford, Boston & Albany and other roads for several years, and have been operated on both the closed and open circuit plan. The advantage of a closed circuit, as in various other kinds of electrical apparatus, is in the fact that the battery must be constantly active, and that in case it gives out the failure of the

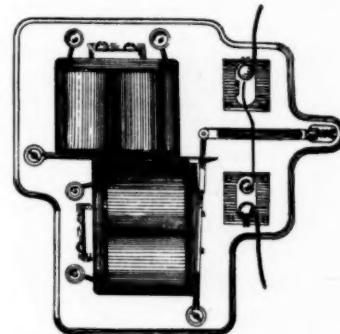


Fig. 3.

signal to work gives a warning to the man in charge, thus enabling him to remedy the defect. But as a means of reducing first cost of wires, instruments and battery and of battery material for maintenance, as well as the labor of taking care of the signals, the open circuit system, like that used in ordinary call bells, was tried. This admits of the use of a battery requiring much less care. The success obtained was so marked

that the decision arrived at is that, for practically perfect work, the cheaper system is fully as reliable as the more complicated one. An automatic audible signal cannot be made absolutely perfect in the way that a visible signal is made faultless by being arranged to fall to danger by gravity in case of a breakage of parts or withdrawal of the force controlling it, because the breakage of a bell hammer or of any part of the apparatus close to the bell may occur under circumstances which no practicable provision could possibly guard against. But with the best of workmanship and reasonable care in maintenance, the service given by a bell of this sort need not be other than practically perfect. The officers of the New York, New Haven & Hartford, on which over 60 of these bells are now in use speak highly of them, and say that they have records of signals which have run twelve or thirteen months without a failure, and they are operated by over 100 trains a day. The cost of material for maintenance they estimate at \$18 per year. This, however, is an average; with the open circuit system in use for all the bells, it could probably be considerably reduced. The cost of inspection and care they do not estimate separately, as it is a portion of the work of men who have numerous other duties.

Traffic Capacity of the New York & Brooklyn Bridge Railroad.

The passengers carried by the New York & Brooklyn Bridge Railroad are already nearly 100,000 per day, and increasing steadily, although in a diminishing ratio, and the capacity of the railroad is greatly overtaxed. Various plans have been suggested for increasing its capacity. Mr. G. Leverich, C. E., who was on the engineering staff of the bridge two years before it was opened, and has been ever since, has just issued a pamphlet containing a very thorough and exhaustive study of the problem, with plans for its solution. The bridge line itself is so important, and the discussion is applicable to so many other cases, that we have given a good deal of space to extracts from Mr. Leverich's pamphlet.

The passengers carried per day, month and year are given in Table I. here much condensed, the monthly record being omitted. The bridge railroad was opened to public use Sept. 24, 1883. The year in Table I. is March to February inclusive.

In January, 1881, Mr. G. Leverich and Mr. F. Collingwood made an estimate of, and report on, the probable traffic over the bridge railroad. This report was based upon statistics of actual travel to and from Brooklyn by the ferries. It was estimated that provision should be made to transport per hour 7,200 passengers in one direction and 1,800 passengers in the other direction. At that time this estimate was regarded by competent authority as unduly large.

Traffic Handled.—The development of the traffic is shown in several extended tables given in Mr. Leverich's pamphlet, some of which we reproduce more or less condensed.

TABLE I.—PASSENGERS PER DAY AND YEAR.

	Per year.	Average.	Per day.	Least.
1883-4	3,067,240	19,196	40,020	7,540
1884-5	9,234,690	25,301	39,572	9,029
1885-6	19,964,690	54,698	79,512	18,765
1886-7	25,316,248	69,360	105,638	27,658
1887-8	28,752,094	78,537	115,357	31,115
1888-9	30,940,635	84,769	119,397	32,868
1889-90	135,008,300	105,913	159,259	41,312

* 5 months. † Estimated.

In the number of passengers carried month by month and in the daily averages, there are great differences; the fluctuation of traffic from Dec. 1, 1884, to Dec. 22, 1889, in months of four weeks each, is exhibited graphically by the diagram, fig. 1. It will be seen that the greatest and least numbers carried daily in each calendar year is generally during the inclement season, late in autumn or in the winter; and that year by year there is a steady but lessening increase.

The total traffic from Brooklyn to New York per year or month is uniformly, and per day is usually, greater than from New York to Brooklyn. Table II. gives the proportions of travel each way for the several years covered by Table I.

TABLE II.—PROPORTIONS OF TRAVEL IN EITHER DIRECTION.

Periods.	Passengers		
	From New York.	From Brooklyn.	Total number.
Five months from Oct. 1, 1883.	1,297,420	1,729,820	3,027,240
Year beginning March 1, 1884.	4,079,489	5,155,201	9,234,690
" " " " " "	1885.. 9,273,698	10,690,902	19,964,600
" " " " " "	1886.. 11,812,111	13,504,137	25,316,248
" " " " " "	1887.. 13,546,815	15,205,189	28,752,004
" " " " " "	1888.. 14,822,451	16,118,151	30,940,635
Ten mo. " " " "	1889.. 13,925,239	15,050,391	28,975,160

Total for 6 yrs. and 3 mos. 68,757,243 77,454,304 146,211,547

Per cent. of total from New York, 47; from Brooklyn, 53.

The traffic varies day by day as affected by the occasion or the weather. The greatest number of passengers over the railroad in one day was on Tuesday, April 30, 1889; 159,259 were carried both ways, of which 74,028, or 46.5 per cent., were from New York, and 85,231, or 53.5 per cent., were from Brooklyn. This was an extraordinary occasion; but the greatest number per day in each month since has increased; thus, on Saturday, Oct. 19, 1889, 137,642 were carried both ways, or but about 14 per cent. less than on April 30, 1889. The number of passengers carried on other days and the relative proportions each way, as determined by actual count, are given in Tables III. and IV. During the day of 24 hours, the traffic over the railroad ebbs and flows irregularly, greater in the morning from Brooklyn and in the afternoon from New York; for a part of each time the cars moving one way will be densely crowded, and those moving the other will be perhaps not one-fourth full; during intervening periods the travel in the two directions may be nearly equal.

At certain times the number of passengers carried during specific hours has been counted and from the data thus obtained Tables III. and IV. were collated, showing the fluctuation and relative proportions of the daily travel at different periods. The mean per cents. in Table III. correspond quite nearly to similar per cents. for the several days mentioned. From this table it will be seen that about 82 per cent. of the total traffic is carried in the 12 hours from 7 o'clock a. m. to 7 o'clock

TABLE III.—PASSENGERS CARRIED ON CERTAIN DAYS.

DAY.	FROM NEW YORK.				FROM BROOKLYN.				Total carried in 24 hours.
	Maximum in one hour.	Between 7 a. m. and 7 p. m.	Between 7 p. m. and 7 a. m.	In 24 hours.	Maximum in one hour.	Between 7 a. m. and 7 p. m.	Between 7 p. m. and 7 a. m.	In 24 hours.	
1883, Oct. 18.	1,420	5,950	1,270	7,220	1,500	7,840	1,440	9,280	16,500
1884, Feb. 27.	2,174	7,070	2,090	9,160	3,073	1,780	2,060	13,840	23,000
Mar. 25.	2,325	8,990	2,290	11,280	2,765	11,710	2,220	13,960	25,240
Apr. 28.	2,405	9,180	2,440	11,620	3,090	12,220	2,260	14,180	26,100
May 20.	2,503	8,930	2,210	11,140	3,006	11,710	2,450	14,160	25,300
June 25.	2,480	8,000	1,820	9,880	3,950	9,690	2,670	12,360	22,240
July 17.	2,150	7,430	1,910	9,340	2,570	8,540	2,140	11,880	21,320
Aug. 13.	2,085	7,900	1,970	9,960	2,496	9,960	2,400	12,560	22,320
Sep. 17.	2,512	9,000	2,130	11,190	3,005	11,387	2,500	13,887	25,077
Oct. 11.	2,710	10,217	2,830	13,077	3,280	13,285	2,750	16,035	29,112
Nov. 17.	2,980	10,515	2,175	12,690	3,709	13,854	2,250	16,104	28,794
Dec. 20.	3,490	10,583	2,845	13,528	4,620	16,211	2,195	18,406	31,934
1885, Feb. 21.	3,473	11,608	3,220	15,828	4,725	17,883	2,800	20,683	36,511
1886, May 25.	7,187	25,306	6,840	32,145	7,870	30,807	7,284	45,961	70,237
1887, Nov. 29.	9,402	33,516	9,200	42,716	10,068	40,721	7,693	48,414	91,130
Mean per cents. in 24 hours.	22.3	79.5	20.5	100	21.8	83.6	16.4	100	One way. Both ways.
	10	35.5	9.1	44.6	12.1	46.3	9.1	55.4	

TABLE IV.—PASSENGERS CARRIED PER HOUR ON CERTAIN DAYS.

HOURS.	Oct. 31, 1888.			Oct. 29, 1889.		
	From New York.	From Brooklyn.	Total.	From New York.	From Brooklyn.	Total.
12 p. m.—1 a. m.	467	298	765	615	267	882
1 a. m.—2 "	237	79	316	295	71	366
2 "—3 "	193	97	290	242	80	322
3 "—4 "	128	118	246	178	115	293
4 "—5 "	127	153	280	146	138	284
5 "—6 "	134	476	610	144	450	594
6 "—7 "	662	3,110	3,802	710	3,780	4,490
7 "—8 "	996	10,324	11,320	989	11,836	12,825
8 "—9 "	880	9,550	10,430	803	11,255	12,148
9 "—10 "	1,070	4,488	5,558	1,270	5,507	6,777
10 "—11 "	1,221	2,638	3,859	1,349	3,079	4,428
11 "—12 m.	1,436	2,275	3,711	1,625	2,205	3,830
12 m.—1 p. m.	1,445	1,761	3,206	1,385	1,857	3,442
1 p. m.—2 p. m.	1,573	2,013	3,586	1,632	2,333	3,965
2 "—3 "	1,593	1,992	3,585	1,581	2,209	3,790
3 "—4 "	2,098	1,802	3,900	2,820	1,985	4,805
4 "—5 "	4,306	1,564	5,870	4,500	1,827	6,327
5 "—6 "	11,413	2,124	13,537	13,355	2,164	15,519
6 "—7 "	9,222	1,386	10,608	10,813	1,392	12,205
7 "—8 "	2,244	1,621	3,865	2,548	1,637	4,185
8 "—9 "	1,538	797	2,335	1,447	714	2,161
9 "—10 "	1,305	675	1,978	1,492	651	2,143
10 "—11 "	1,437	884	2,321	1,509	766	2,275
11 "—12 "	1,470	687	2,157	1,306	662	1,968
Total.	47,185	50,942	98,127	53,044	57,190	110,234
Per cts. each way.	48.10	51.90	100.00	48.10	51.90	100.00

p. m., and about 22 per cent. in one-sixth of this time, the maximum morning and evening hour. The number of passengers each way carried each hour of four days about 18 and 12 months apart, is given in Table IV., and is for the even hour as noted in the first column*. The maximum number therein recorded carried both ways is 15,519 passengers, and one way is 13,355 passengers, each between 5 and 6 o'clock p. m. Tuesday, Oct. 29, 1889. During the morning and evening rush, when the travel for a short time is greatly concentrated, it may exceed these numbers; thus Monday, Nov. 18, 1887, 12,160 passengers, and about a year later over 14,000 passengers, were carried from New York to Brooklyn in the hour from 5.30 to 6.30 o'clock p. m. Doubtless on other days of which there is no record, as on Tuesday, April 30, 1889, above mentioned, a still larger number of passengers per hour was carried. It will be seen from these figures that already the number of passengers carried in one hour and in one direction is about twice as great as the estimate made by Messrs. Leverich and Collingwood in 1881.

Probable Increase of Traffic.—It is difficult to estimate with reasonable certainty what in the future will be the increase of traffic on the bridge railroad, and the table which follows must be taken as merely speculative. Taking the number of passengers carried annually the five years beginning March 1, 1885, and given in Table I. as a basis, and assuming that the yearly increase in the past therein exhibited, establishes a uniform law for the future, the second column of Table V. was computed; its probable value is to suggest in some degree what the traffic over the bridge railroad may be, should, as is very improbable, the governing conditions remain unchanged. The second and third columns of the table are similarly based on the record for these past years.

TABLE V.—ESTIMATE OF TRAVEL EVERY FIFTH YEAR FOR FIFTY YEARS, FROM MARCH 1, 1885.

Year.	Maximum number of passengers		
	Total for the year.	Any day.	Any hour one way.
1890.....	37,000,000	169,000	21,000
1895.....	44,250,000	202,000	25,000
1900.....	49,300,000	225,000	28,000
1905.....	53,250,000	243,000	30,000
1910.....	56,600,000	259,000	32,000
1915.....	59,500,000	272,000	34,000
1920.....	62,050,000	284,000	36,000
1925.....	64,350,000	294,000	37,000
1930.....	66,450,000	304,000	38,000
1935.....	68,400,000	313,000	39,000

Train Service.—Since the bridge railroad was first operated, the number of trains over it run daily and of cars in each train has steadily increased, these being changed as need be to accommodate the fluctuating traffic offered, which varies with the occasion and the weather, as well as the time of day, the day of the week and the season. Experimentally, 3 three-car and 10 two-car trains were run on 1½ minutes headway, 1½ hours in the morning and 2 hours in the evening, Sept. 27, 1886. Usually, however, the minimum headway during the day's run is 1½ minutes. Table VI., compiled from the train dispatcher's daily record, giving the number, order and headway of trains sent out from Brooklyn station during the days mentioned, exhibits fairly the operation of the railroad, the last, April 30, 1889, being that on which the greatest number of passengers, 159,259, so far carried in one day were taken. It is to be noticed that the same trains

were also sent out and in the same order from New York station.

Present Facilities.—On a double line of railroad, like that on the bridge, the possible number of trains dispatched in a given period is limited by the time required at the switch to move them from the incoming to the outgoing platform, as well as by the time spent in discharging and receiving passengers. Since the railroad was first operated the transfer switches have from time to time been extended and improved.

With the present facilities for hauling trains the capacity of the railroad to carry passengers can be increased only by running more four-car trains and by lessening the headway between them. The least recorded in Table VI. is 1½ minutes; if this is reduced to 1¼ minutes, one-fifth more trains may be run in the same time, or 180 cars per hour, and with the transfer switches and the platforms as now arranged trains cannot with certainty be handled at the stations in less time.

TABLE VI.—NUMBER AND HEADWAY OF TRAINS. 24 hours, midnight to midnight.

May 1, 1888.			April 23, 1889.			April 30, 1889.		
No. of trains.	Cars in train.	Headway, minutes.	No. of trains.	Cars in train.	Headway, minutes.	No. of trains.	Cars in train.	Headway, minutes.
12	4	4	12	4	4	11	3	4
9	15	15	17	15	15	34	7½	7½
8	15	15	12	4	3	20	4	4
16	4	4	12	4	3	23	4	1½
10	3	1½	120	4	1½	25	4	1½
140	3	1½	20	4	3	101	4	1½
138	3	3	87	3	3	15	4	2
72	3	1½	35	4	3	93	4	2½
18	3	3	70	4	1½	150	4	1½
10	3	4	10	4	3	45	4	3
55	2	4	7	4	4	45	4	4
			10	3	4			
			38	2	4			
487 trains. 1,353 cars.			473 trains. 1,501 cars.			572 trains. 2,169 cars.		

Maximum Capacity.—To determine the maximum number of cars that may be dispatched over a single main line in each direction, irrespective of the time spent at the stations in stops or in transferring the trains from one main to the other; let the length of a car = l , the space between adjacent running trains = h , and their speed of movement per minute = v , all in feet, and the number of cars in a train = n ; then the length of a train = ln , and the space from the front of a train to the front of the train next following = $ln + h$. The headway of trains, in minutes,

$$H = \frac{ln + h}{v} \quad (1)$$

and the number of cars dispatched per hour,

$$N = \frac{60av}{ln + h} \quad (2)$$

On the bridge the speed of the cable is 10 miles per hour, and the cars are generally about 50 ft. in length between coupling pins, hence $v = 880$ and $l = 50$ ft. Assuming that trains will not be run with space between them less than a train length, then for the maximum number of cars which may be dispatched per hour,

$h = ln$, the minimum headway $H = \frac{n}{8.8}$ and the number

of cars, $N = 528$; whence under the assumption, 528 cars may be sent out per hour or 132 trains of four cars each; the number of cars dispatched being independent of the number of cars in the train.

To fully determine the maximum number of cars which may be run, it is necessary also to consider the effect on the headway, of stopping and starting the trains at the station platforms or on the transfer switches. Thus for a train, which in time = T in seconds, over a space = S in feet, with uniformly accelerated or retarded speed, starts from rest and takes a constant velocity. = V in feet per second, or contrariwise, from movement at such constant velocity, is brought to rest.

$$T = 2 \frac{S}{V} \quad (3)$$

and for any space s , less than S , the corresponding time,

$$t = \frac{2}{V} (Ss) \quad (4)$$

For two trains, of n number of cars, each l in feet long, whence of train length = ln , running on one track, one starting from and the other stopping at the same plat-

* We have omitted from Table IV. the records for May 25 1886, and Nov. 29, 1887.—EDITOR.

form, with, as before, uniformly accelerated or retarded speed, the least possible headway in seconds between them, that the incoming train may not overtake the outgoing one, is,

$$\text{if } ln \text{ is less than } 2S; \quad H = \frac{4}{V} \left(\frac{Sln}{2} \right)^{\frac{1}{2}}; \quad (5)$$

$$\text{and if } ln \text{ is greater than } 2S \quad H = \frac{2S + ln}{V}. \quad (6)$$

If it be assumed, as is reasonable, that the space S in which a train starts or stops is in proportion to its length, then for S may be written, aln and the above give

$$H = \frac{4}{V} \ln \left(\frac{a}{2} \right)^{\frac{1}{2}}; \quad (7)$$

$$\text{or } H = \frac{2a + 1}{V} ln; \quad (8)$$

that is, the minimum headway between trains stopping and starting regularly at a platform or elsewhere varies directly with the length of the train or the number of cars in it; and as before, the maximum number of cars that may be dispatched is independent of the number of cars in the train.

By this examination it appears that if the tracks, platforms and transfer switches or loops permitted, 528 cars may be run per hour; that is 132 trains of four cars each, on a headway of 27½ seconds and with a space between adjacent trains on the main lines of 200 feet. As previously stated; first, three-car trains have been run on 1½ minutes headway, whence 144 cars or 48 trains were dispatched per hour; second, four-car trains are now run on 1½ minutes headway, whence 160 cars or 40 trains are dispatched per hour; and third, as the platforms and switches are now arranged, four-car trains may possibly be run on 1½ minutes headway, whence 180 cars or 45 trains may be dispatched per hour. Comparing these statements of the past and present running of trains with that of the maximum capacity of the railroad as estimated above, the latter is 3½ greater than the first, 3½ greater than the second, and 2½ greater than the third.

Dividing the present minimum headway—1½ minutes—into three parts: at the station the train is emptied, shifted from one main line to the other, and loaded, each in about 30 seconds. With a suitable arrangement of platforms and transfer tracks, 40 seconds may be taken as the minimum time a train may stop to discharge or receive passengers, without undue crowding or haste; also 25 seconds as the minimum safe headway on the main lines, whereby four-car trains will be separated by a space of 166½ ft. There are 40 seats in each car, and by filling the main aisle 100 passengers may be carried without crowding. From this data, the number of passengers which may be transported in trains running on headways varying from 25 seconds to 1½ minutes, as given in Table VII., was computed.

TABLE VII.—IN FOUR-CAR TRAINS, WITH ALL SEATED 40, AND WITH SEATS AND AISLES FILLED, 100 PASSENGERS PER CAR.

On main line.			Passengers per h'r.		
Headway of trains.	Space between trains.	Time at platforms.	Trains per hour.	Seats filled.	Capacity compared with four-car trains running on 1½ minutes headway.
Min. sec.	Feet.	Min. sec.			
0-25	163½	0-50	144	57,600	33-5
0-30	240	1-0	120	48,000	27-0
0-35	313½	1-10	102 6-7	41,142	23-4
0-40	386½	1-20	90	36,000	20-0
0-45	460	1-30	80	32,000	17-8
0-50	533½	1-40	72	28,800	15-6
0-55	606½	1-50	65 5-11	26,181	13-5
1-0	680	2-0	60	24,000	12-0
1-5	753½	2-10	55 5-13	22,154	10-6
1-10	826½	2-20	51 3-7	20,571	9-2
1-15	900	2-30	48	19,200	8-0
1-20	973½	2-40	45	18,000	7-0
1-25	1,046½	2-50	42 6-7	16,941	6-2
1-30	1,120	3-0	40	16,000	5-6

Table VIII. shows the maximum number of passengers per hour carried either way on two days: first, on Tuesday, Oct. 29, 1889 (the last on which the number hourly was counted), the total number carried both

P'ns g'rs
in four
weeks.

3,400,000

3,300,000

3,200,000

3,100,000

3,000,000

2,900,000

2,800,000

2,700,000

2,600,000

2,500,000

2,400,000

2,300,000

2,200,000

2,100,000

2,000,000

1,900,000

1,800,000

1,700,000

1,600,000

1,500,000

1,400,000

1,300,000

1,200,000

1,100,000

1,000,000

900,000

800,000

700,000

600,000

500,000

400,000

300,000

200,000

100,000

0

7 0,000

6 0,000

5 0,000

4 0,000

3 0,000

2 0,000

1 0,000

0 0,000

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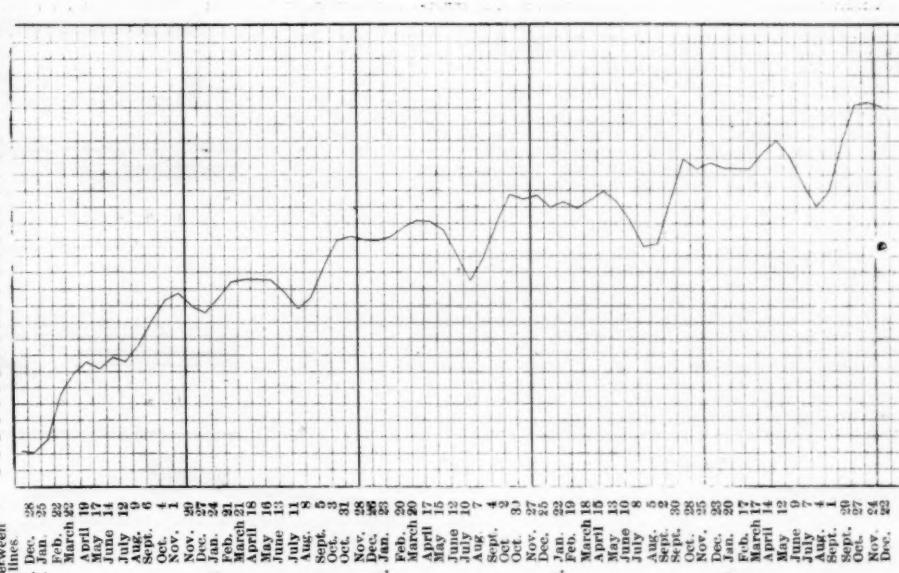
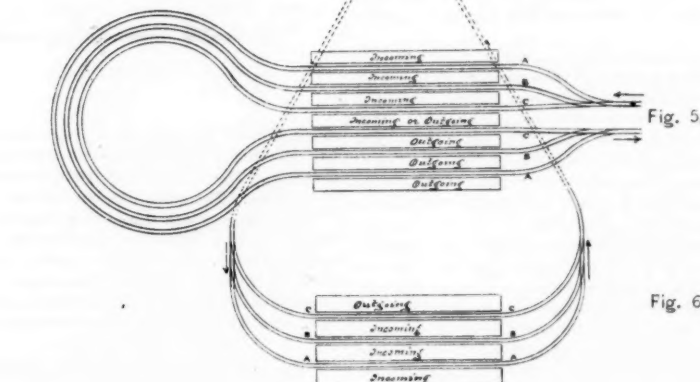
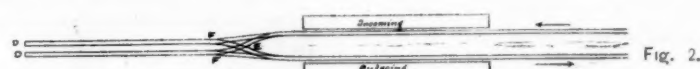


FIG. 1.—DIAGRAM SHOWING FLUCTUATION OF PASSENGER TRAFFIC.



TYPICAL DIAGRAMS OF TERMINAL STATIONS.

TABLE VIII.

MAXIMUM NUMBER OF PASSENGERS PER HOUR CARRIED EITHER WAY, THE LEAST NUMBER OF CARS AND OF TRAINS REQUIRED AND THEIR HEADWAYS.

HOUR BEGINNING AT	110,234 passengers carried both ways Oct. 29, 1889.						313,000 passengers carried both ways per day.					
	40 passengers in a car.			100 passengers in a car.			40 passengers in a car.			100 passengers in a car.		
	Number of passenger loads.	Number of 4-car trains.	Headway.	Number of passenger loads.	Number of 4-car trains.	Headway.	Number of passenger loads.	Number of 4-car trains.	Headway.	Number of passenger loads.	Number of 4-car trains.	Headway.
6 a. m.	3,780	95	24	M. S.	38	10	11,038	276	69	M. S.	111	28
7 "	11,836	296	74	0 45	119	30	35,562	890	223	0 16	336	84
8 "	11,255	282	71	0 50	113	29	32,865	822	206	0 17	329	82
9 "	5,507	138	35	1 42	56	14	16,081	403	101	0 35	161	41
10 "	3,079	77	20	3 0	31	8	8,991	225	57	1 3	90	23
11 "	2,205	56	14	4 17	23	6	6,439	161	41	1 27	65	17
12 m.	1,857	47	12	5 0	19	5	5,423	136	34	1 45	55	14
1 p. m.	2,333	59	15	4 0	24	6	6,871	172	43	1 23	69	18
2 "	2,209	56	14	4 17	23	6	6,451	162	41	1 27	65	17
3 "	2,890	71	18	3 30	29	7	8,235	206	52	1 9	83	21
4 "	4,500	113	29	2 4	45	12	13,140	329	83	0 43	132	33
5 "	13,355	334	84	0 42	134	34	39,000	975	244	0 14	390	98
6 "	10,813	271	68	0 52	109	28	31,574	790	198	0 18	316	79
7 "	2,548	64	16	3 45	26	7	7,441	187	47	1 16	75	19

ways that day being 110,234; and second, on a future day in 1935, as estimated, Table V; the maximum number to be carried on any day in that year being 313,000, and either way any hour in the day 39,000, and for other

hours proportionate to the corresponding number on Oct. 29, 1889; also the number of cars and of four-car trains required per hour to convey these passengers, if there were, in one case, not more than 40 passengers in a car, or one per seat; and in the other case not more than 100 passengers in a car, or so many as could comfortably occupy the seats and aisles; and lastly the corresponding headways for these trains.—[To save space we have omitted from Table VIII. the morning hours before 6 a. m. and evening hours after 7 p. m. In these hours there is no difficulty.—EDITOR.]

By this table it appears that during the entire 24 hours, with 40 passengers in a car, only from 7 to 9 o'clock a. m. and from 5 to 7 o'clock p. m. are the train headways the first day less than now during the busy hours, that is 1½ minutes; and with the trains running on this headway there would have been on these several hours but from 68 to 84 passengers per car. Similarly for the second day, except on these hours, the headways are not less than 35 seconds; and with the trains running on 30 seconds headway, there would be on the several busy hours but from 66 to 82 passengers per car. Therefore it follows in each case, that if there were means provided to admit to the outgoing platform at one time not more than a train load of passengers, others in order of arrival at the station being held back, in a waiting room large enough for the purpose and having easy and abundant communication with the platform, until the next outgoing train was ready; generally each passenger would have a seat, and even when the throng was greatest no one would be detained longer than one headway, and all crowding on the platforms would be avoided.

Referring to the "typical diagrams of terminal stations," figs. 2 to 6; for a double track railroad with an incoming and an outgoing platform and transfer switches at each terminal, as shown, fig. 2, let the time in which the train runs from a given point on the incoming track, and comes to rest at the incoming platform, or starting at the outgoing platform reaches a

corresponding point on the outgoing track = b ; the time it remains at either of the platforms = p , or starting from rest, in which it is moved its length = c , and the headway between the trains on the main lines = H , then that an incoming train may not overtake the preceding train at the incoming platform,

$$b + H = \text{or} > b + p + c; \text{ hence } H = \text{or} > p + c. \quad (9)$$

Let the time in which a train is transferred from one platform to the other = d , then if the trains are run one after the other on the switch without stop or interference at crossings, that an outgoing train may not overtake a preceding one at the outgoing platform, as before,

$$H = \text{or} > p + c.$$

If however, the main tracks are each divided at the stations into two or more branches, with a platform for each branch, as shown, figs. 3, 4 and 5, thus forming a system of incoming and outgoing slips, and the trains are run into and out from these slips in numerical order, there will be as many headways between two adjacent trains entering or leaving a slip as there are branches of each main line or pairs of slips. If, as before, the trains are transferred from the incoming to the outgoing slips without stop or interference one with another, that a train may not overtake a preceding one at a platform, for a double system of slips, as shown, figs. 3 and 4.

$$H = \text{or} > \frac{p + c}{2}; \quad (10)$$

and for a triple system of slips, as shown, fig. 5,

$$H = \text{or} > \frac{p + c}{3}; \quad (11)$$

therefore, as $p + c$, the total time a train, first remains at a platform to discharge or receive passengers, and then starting from rest it is moved its length (which cannot fall below a certain limit) it appears that for a fixed value of this limit, the headway between adjacent trains on the main line, so far as platform arrangements are to be considered, may be reduced as the number of slips is increased.

TO BE CONTINUED.

Combination Box and Gondola Car.

The scheme which we illustrate, for temporarily housing in gondola cars is patented by Mr. William Borner, General Western Division Freight Agent of the Pennsylvania Co., at Chicago. The fundamental object is to reduce the unloaded mileage of gondola cars. It is estimated by Mr. Borner that the revenue mileage of these cars could be increased 30 to 40 per cent., were his plan adopted.

Fig. 1 is a side view of an ordinary gondola car, which illustrates the principal features of the invention as it appears when ready for use. Fig. 2 shows the superstructure removed, folded and stored for transit. Figs. 3 and 4 are sectional views. Fig. 5 is a detailed view of top and side when folded for transportation. Fig. 6 is a detailed sectional view, and fig. 7 a top view in detail of two sections of the sides of the car body showing the manner in which they are attached to each other. Fig. 8 is a sectional view of a stock car with the improvement applied.

The removable superstructure consists of a sectional bottom composed of a series of framed bars or racks arranged as shown in figs. 3 and 4, and placed loosely on the bottom of the car, with a floor, which is either separate from, or attached to the bars. The sides of the cars are formed by a series of sections, one end of each cleat of which is arranged to overlap the adjacent section, as shown in figs. 4, 6 and 7, and to which it is attached by means of a bolt and nut. The ends of the car body are formed of two sections bolted to cleats and diagonal braces as well as to the side sections. The top of the car body is composed of hinged sections meeting at the middle of the car, and battens arranged to fit the roof are placed over the joint of the hinged sections of the roof and secured by means of bolts extending downward to a metal plate, to which are attached horizontal cross-ties which pass through the side sections and secured by nuts, thereby serving as a truss to hold roof in place.

The sides of the car are secured from longitudinal movement by means of wooden and iron braces, as shown in fig. 6. Clips are used to attach the side cleats to the bottom of the car body by means of bolts. When this removable car body is attached to the ordinary gondola car already constructed, doors are provided, as shown in fig. 1, at the sides above the side boards; but in new cars the doors are provided in the side boards, as shown in fig. 2. The sections may be removed and stored in the receptacle beneath the car, as shown in fig. 2.

One of the advantages of a secondary bottom raised on slats is to provide for ready drainage. When this device is used on stock cars it is placed within the car, as shown in fig. 8.

The Fast Run from Washington to Philadelphia.

Most of the reports published concerning the run made by the Pennsylvania train carrying A. M. Palmer's theatre company from New York to Washington and back, March 10, made special mention of locomotive No. 10, which drew the train over the New York Division. This engine has 78-in. driving wheels. The trip between Philadelphia and Washington, a considerably longer distance, was made by a Class P. engine, which has driving wheels only 68 in. in diameter. This portion of the road is not so well provided with separate tracks for freight trains, and is considerably crowded, so that the train sheet showing this run, which we print herewith, is regarded by those familiar with the road as showing a remarkably fine performance. The engine was No. 35, and was manned by A. O. Denio, Road Foreman of Engines,

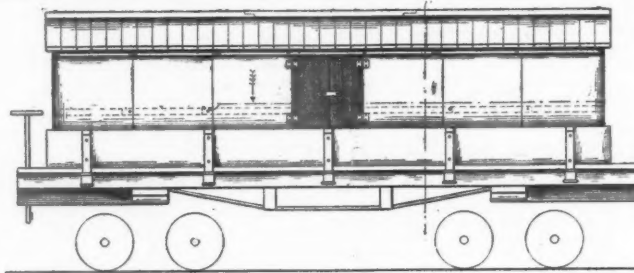


Fig. 1.

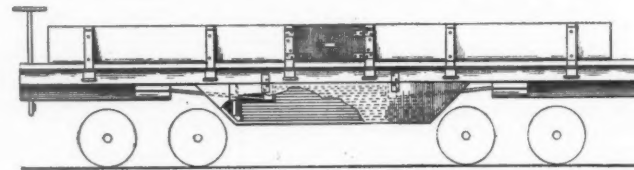
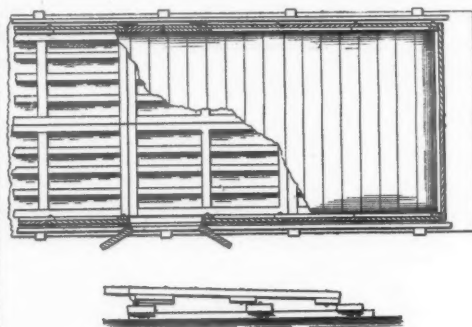
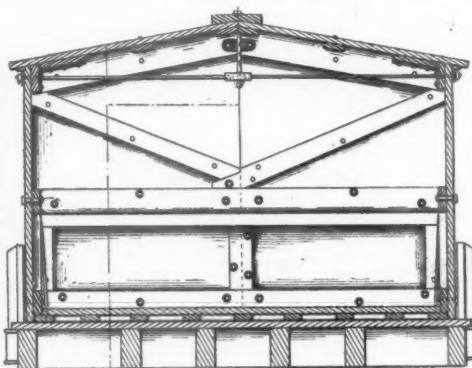
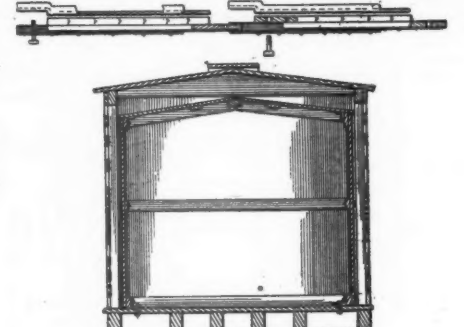
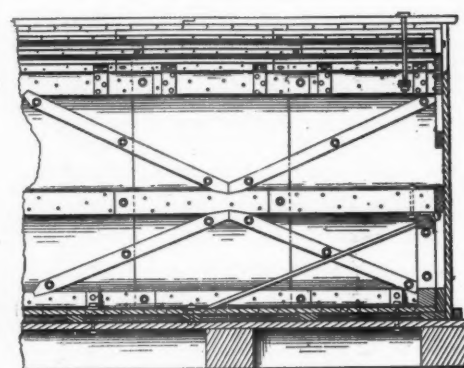


Fig. 2.



Figs. 3, 4 and 5.



Figs. 6, 7 and 8.

HOUSING FOR GONDOLAS AND STOCK CARS.

W. J. Hukill, engineer, and Frank Hartzell, fireman. It has cylinders $18\frac{1}{2} \times 24$ in., and carries 160 lbs. steam pressure. The southbound trip was made in 2 hours and 32 minutes. The train consisted of three cars.

The average speed from Washington to Newark, 98.7 miles, was 55½ miles per hour, and to Gray's Ferry, 54 miles per hour. The highest speeds attained between stations were as follows: Bennings to Bowie, 64.85; Charleston to North East, 66; Bacon Hill to Elkton, 67, and Landith to Lamokin, 66.6 miles per hour.

Proposed Changes in the Interchange Rules.

At the last meeting of the Western Railway Club suggestions for changes in the Rules of Interchange were offered by Mr. G. W. Rhodes:

Rule 12. Add to the rule a paragraph similar to the last one of Rule 25, namely, "No percentage to be added for either ma-

terial or labor except as provided for in Rule 10." The prices for both material and labor in Rules 12 and 25 are based on cost. This being the fact, if it is right to add 10 per cent. in one case, it should also be added in the other, and thus preserve a uniformity in the conception of the rules.

Rule 27. Insert "by fire" on the fourth line after the words "damaged" or "destroyed." The rule will then read: "When damaged by fire or destroyed by fire upon a private track When this rule was first adopted it was intended to cover fire cases only. This distinction has been omitted of late, and it is now possible for a switching road to claim exemption from responsibility under the broad head of 'damaged car,' i. e., braces stolen on a private track, draft rigging damaged, siding damaged, etc., etc.

Rule 29. In the second paragraph of the rule strike out the following clause: "Should one of the parties refuse, or fail to furnish necessary information, the committee shall give their decision on the evidence presented." This is a very unusual order to impose on a judicial committee. I prefer the committee's rule of last year, which required each company in dispute to agree to abide by the decision of the committee before the committee would consider the case at all. This is especially important in view of the fact that the committee may at any time be called upon for an opinion in a dispute between parties, one only having subscribed to the rules. Many railroad and

PHILADELPHIA, WILMINGTON & BALTIMORE R. R. North-bound Run of Special Train, March, 10, 1890.

Blocks	Time P. M. h. m. s.	Distance from Wash. m.	Time from Wash. m. s.	Distance Bet. Blocks. m.	Time Between Blocks. m. s.	Notes.
Washington	3 14 50		4 40	1.7	4 40	Yard.
Navy Yard	3 19 30	1.7	6 45	1.8	2 05	
Anacostia	3 21 35	3.5	8 45	1.7	2 00	
Bennings	3 23 35	5.2	10 40	11.8	10 55	Lanham's Grade.
Bowie	3 34 30	17.0	25 50	6.9	6 10	
Odenton	3 40 40	23.9	31 35	6.2	5 45	
Stony Run	3 46 25	30.1	36 00	3.9	4 25	Water.
Winans	3 50 50	34.0	39 50	3.3	3 50	Winans' Grade.
Loudon Park	3 54 40	37.3	42 40	2.5	2 50	
Fulton Junction	3 57 30	39.8	45 40	1.7	3 00	Tunnel.
Baltimore & P. Junction	4 00 30	41.5	46 40	0.3	1 00	Yard.
Baltimore	4 01 30	41.8	52 30	3.8	5 50	Tunnel.
Bay View	4 07 20	45.6	63 40	11.4	11 10	Gunpowder and Bush River Trestles and Water.
Chase's	4 18 30	57.0	73 35	8.7	9 55	
Bush River	4 28 25	65.7	76 55	3.1	3 20	
Perryman	4 31 45	68.8	84 40	8.3	7 45	
Havre de Grace	4 39 30	77.1	86 30	0.8	1 50	Susquehanna Bridge.
Perryville	4 41 20	77.9	88 00	1.1	1 30	River Grade.
Woodburn	4 42 50	79.0	92 00	3.9	4 00	River Grade.
Charleston	4 46 50	82.9	94 55	2.2	2 55	
North East	4 49 45	86.1	97 50	3.1	2 55	Bacon Hill.
Bacon Hill	4 52 40	89.2	100 40	3.2	2 50	
Elkton	4 55 30	92.4	104 10	3.6	3 30	Iron Hill.
Iron Hill	4 59 00	96.0	106 40	2.7	2 30	
Newark	5 01 30	98.7	116 10	8.2	9 30	Train 16 ahead and water.
Newport	5 11 00	106.9	118 55	2.5	2 45	
West Yard	5 13 45	109.4	121 10	1.4	2 15	
Wilmington	5 16 00	110.8	123 25	3.3	2 15	Yard.
Landith	5 18 15	112.1	133 25	11.1	10 00	
Lamokin	5 28 15	123.2	141 20	4.8	7 55	Train 74 ahead.
Moore's	5 36 10	128.0	146 20	4.1	5 00	Train 74 ahead.
Paschall	5 41 10	132.1	149 10	2.0	2 50	
Gray's Ferry	5 44 00	134.1				

individual companies operate under the rules, though they do not appear among the list of subscribers. If, however, it is not thought advisable to have this requirement, at least strike out the clause we have named, and leave it to the judgment of the committee whether it can "decide intelligently" on such one-sided evidence as some member may see fit to refer to them.

New Rule. In its proper place, probably after rule 15 and number 16, add the following:

Rule 16. In repairing damaged cars, M. C. B. standards may be used, when of design and dimensions that do not mar or impair the strength of the car, in lieu of the parts forming its original construction.

The M. C. B. automatic drawbar of any recognized manufacture may be used, providing it conforms strictly to the lines adopted by the association, and also providing that not less than 25,000 cars are in successful service equipped with the drawbar.

Rule 15. On the sixth line insert in parentheses after the words "originally used," (except as provided in rule 16) "new standard parts, may, however, be used if agreed to."

The question is frequently asked, what can we do to contribute to more uniformity in car construction? What steps do we take to introduce the standards of the association more generally, and what is the advantage to railroad companies of the M. C. B. standards? A new rule, such as is outlined for No. 16, would, in part, answer each of these questions. The use of the M. C. B. standards, in lieu of the car's original construction, has been tacitly accepted between some railroads for some years past, and we are of the opinion the time is now ripe to make it one of the rules of the association.

Prior to the Association's present stand on the drawbar question, a favorite way of showing the evils of each line having its own standard bar was to tabulate the number of different drawbars a through line was obliged to carry for its foreign cars. Unless some immediate action is taken on this matter the members of the Association will find that in place of carrying 40 or 50 different kinds of link and pin drawbars, the day is not very distant when we may find ourselves obliged to carry a nearly equal variety of a much more expensive bar in first cost. That such bars must conform strictly to the M. C. B. lines is an important qualification, and one which it will be well, not only for railroads, but for manufacturers to pay more attention to than they are now doing. We have known M. C. B. couplers issued by one firm, made so carelessly that they would not couple with each other, and others that are being introduced vary from the lines in important particulars. By ignoring the M. C. B. lines it is possible, under certain conditions of wear, to render the coupler an insecure one.

There has been some talk of introducing a two card system, and as the Western Railway Club was one of the first to advocate such a plan, a matured opinion from the club might be useful. So far as our experience goes, many who were allured into advocating the scheme at first are totally opposed to it now. We wish to be included among the latter. The Central Railway Club have recently had the matter under consideration. Their committee have realized that such a card would fail to be recognized and soon have no value unless carrying with it some obligation. It is therefore proposed to use a red card for old defects, and that this card shall be authority for any railroad company to make the repairs, not against the railroad applying the card, but against the owner of the car. Why deceive ourselves by means of a colored card? Under such a rule any railroad may issue a red card and bill against the owner of the car for such old defect as he considers it essential to repair. If this is what is wanted we might much better insert a new rule about as follows:

"Any railroad company finding old defects on foreign cars, the repairs of which are essential to the safety of trainmen and the running of the car, shall make the repairs and bill against the owner of the car." I need scarcely add we would oppose such a rule. The repairs should be made, but the company making them should pay for them. Some, however, advocate the use of a second card that carries no obligation. At best this would only give a temporary relief and would soon be of as little value as our paper currency, if it carried no obligation with it. If we are to accept a car with old defects, when a card carrying no obligations with it says they are old, why is it not much simpler to accept it without any card?

In conclusion, I think the Association should take some steps toward securing a more complete list of subscribers to the rules.

A. M. WAITT: It seems to me proper that there should be some addition to the number of defects for which owners are responsible. We are all agreed that when wheels are worn out under fair usage they should be replaced at the cost of the owner of the car, and I do not see why the same should not be true as regards journal bearings and, possibly, brake shoes. It seems to me it is no more than proper that it should be incorporated in the rules, that the owners of the cars should be responsible for those parts of the cars that are being constantly worn out.

Mr. RHODES: The difficulty would be to determine when the shoes and the brasses were properly worn out. It is true we agree to trust to the honesty of the different roads as to wheels, but there is a check on them. They are all numbered, and the same is true of axles, and there is some way of tracing them. But if you come to other parts, such as brasses and brake shoes and other parts of the car's construction, it seems to me we should get where we would allow our neighbors to repair our cars *ad libitum*. On the other hand, if the Lake Shore road has to replace a good many worn-out brasses and worn-out shoes of their neighbors' cars, their neighbors probably have to reciprocate.

Mr. WAITT: There are many of the cars that belong to private companies and corporations which run over our lines and do not get the same care as those owned by railroads, and there are the cases of those roads which do not have shops to take care of their cars, and who feel that the other railroads will take care of them. Therefore, to get justice done to the larger roads, it seems to me that in regards to brasses at least, something of that kind ought to be incorporated in the rules. On our own road all our brasses are stamped with the date in the same manner as the wheels, and I don't think it would entail any great difficulty if that were incorporated in the rules. We keep a record of our brasses, the date of them and the place where they were applied. I think a limit could be adopted by which the inspectors could be guided.

Mr. VERBRUYCK: The matter of brasses was very thoroughly discussed a good many years ago, when we formed these rules, and it was thought that the brasses and such other parts as Mr. Waitt has been speaking about would balance or equalize themselves. At junction points, if a road offers you a car with a brass worn out, you can refuse it or put one in and get pay for it.

Mr. WAITT: Within two weeks I have had four cases of the renewal of brasses in cars belonging to a road with which we have no direct interchange of cars. The cars got to a certain point on one of our divisions, and the inspector of the connecting road very justly refused them because of the worn-out brasses. We had to put in new brasses, and we had no way of retaliation with that road because we do not interchange. Mr. Chamberlain says he puts in carloads of brasses every year.

Mr. RHODES: It is proposed to make additions to Rule 12, making it similar to Rule 25. Rule 25 has a clause in it which says that no percentages shall be added for any material or labor except as provided in Rule 10. That means that you cannot charge any percentage against a railroad company, but you may against a private company. I move that it is the sense of the Western Railway Club that there be added to Rule 12, the following clause: "No percentage to be added for either material or labor except as provided for in Rule 10." Seconded and carried.

Mr. RHODES: No. 16 is proposed as a new rule. I con-

sider it a very important rule, and it is one to which I have given serious attention. Take the different M. C. B. drawbars that are being introduced, for instance; very few of them conform strictly to the M. C. B. lines. You will have hard work to find one, and the strange thing is that people are ignoring that entirely, and yet upon the uniformity of the lines depends in a great measure the success of the M. C. B. coupler. You will observe that by this rule any M. C. B. drawbar of recognized type may be used in lieu of the particular ones on the car, provided 25,000 bars are in use. I think that is an important provision. If not less than 25,000 must have been put in service before they can thus be used in repairs, it is altogether probable that no cheap drawbar could be substituted. I move the adoption of proposed rule 16. Carried.

Proposed rule 15 was adopted.

Mr. RHODES: Probably most of us have had more or less question about Rule 27, and you may have seen recently the difficulty it has given the arbitration committee in one case. Some cars were delivered to a private track on a switching charge, and while they were on that private track the owners of the track cut holes through the ends of cars to get the lading out. When the matter came to be investigated they said they did not do it, and the switching company was released from all responsibility, as they said under Rule 27 it was the road that got the freight that had to settle with the private company. It was a clear case that they had to settle. Rule 27 was very ill-advisedly changed at the last convention, and we now propose to insert "by fire" as the rule was originally intended to cover only fire cases. Let us cross out everything on page 23 of the code that has been added, and let the rule stand as it was originally. I would move that we recommend that Rule 27 be amended in that way. Seconded.

Mr. BARR: The settlement for damaged cars of that kind can be more readily done by the company which is right on the ground. It certainly appears to me that it is not a good idea to have the rule apply exclusively to damage by fire. At the same time it doesn't seem quite right to hold a railroad company that simply does switching responsible for that damage. The other company is right on the ground in all cases. Supposing we have a car in Louisville or St. Louis, damaged by fire; we cannot go there and settle the matter, and the road that hauls the car ought to settle it. If you will eliminate that switching matter, it will probably strike Mr. Rhodes as hard as any one else, but I don't exactly see why we should cut out that portion of the rule.

Mr. RHODES: My motion is to cross out on the top of page 23 the word "except" and everything that follows it in Rule 27. The rule would then read as it has for three years past.

Mr. Rhodes's motion was carried.

Mr. RHODES: Rule 29, I think, is a very unfair one to impose upon our arbitration committee. I move that we cross out the words: "Should one of the parties refuse or fail to furnish necessary information, the committee shall give their decision on the evidence presented." Carried.

Mr. SMITH: It seems to me there is a word left out in Rule 10, next to the last line; the word "bolsters." "Railroad companies shall not be liable for the replacement of broken bolsters or draft springs." It does not seem to read just right as it is there now, and I should say that if the letter "s" was left off the word "bolsters" it would make it plainer, and I would move that it is the sense of this meeting that the rule be made to read, "Broken truck bolster spring or draft springs." Carried.

State Railroad Commission Reports.

VIRGINIA.

The report of General J. C. Hill, Railroad Commissioner of Virginia, for the year ending June 30, 1889, has been issued. The number of miles road in the state is 3,384, including 124 miles constructed during the year. The 47 companies reporting have 3,672 miles of road. Their gross earnings amounted to \$20,149,919; expenses and taxes \$14,423,028. Payments of interest amounted to \$5,407,077, and the net earnings (after paying interest) were \$319,814. Average gross earnings per mile were \$5,795; average net earnings per mile on 1,460 miles, \$1,257; average net losses per mile, on 2,018 miles, \$751.

The Commissioner states that the earnings have largely increased and that expenses for improvements of terminal facilities have been large. The roadways, bridges and equipment have also been greatly improved. The Richmond & Danville, Norfolk & Western, Shenandoah Valley and other roads have made considerable reductions in local rates. The companies begin to realize the true value of local business, and are trying to make friends of the people who live along their line. Car heating and freight car couplers are discussed in a sensible manner. The Commissioner recommends the Legislature to appoint an officer who shall spend his whole time examining the physical condition of roads and rolling stock; this is necessary to comply with the requirements of existing law. A long and short haul law should be enacted, subject to exceptions in special cases under the approval of the Commissioner. The Commissioner's previous recommendation of a law similar to the Interstate Commerce law is repeated. The principal train accidents of the year are discussed at length. The failure of the trestle near Orange Court House, July 12, 1888, by which nine people were killed and 25 injured, is believed to have been the result of unsound timbers, and not of a derailment. Eleven passengers, 76 employees and 48 other persons were killed, and 45 passengers, 668 employees and 81 other persons were injured during the year on the roads reporting. This is a total of 135 persons killed and 793 injured, presumably all within the state of Virginia.

NEW JERSEY.

New Jersey has no railroad commission, but the report of James Bishop, Chief of Bureau of Statistics of Labor and Industries, devotes considerable space to railroad casualties, employers' liability, and some other topics pertaining to railroad affairs. There are over 60 pages concerning co-operative building and loan associations,

The report for the year ending Oct. 31, 1888, which comes out over a year after its date, embraces exhaustive compilations of railroad accident statistics and casualties, not only for New Jersey but for other states of the Union and European countries. Some of the latter have been obtained direct from consuls of foreign nations. Casualties to railroad employees in New Jersey are tabulated for 36 years, and apparently all the statistics available have been gathered from every state. Copious extracts from the census of 1880 are given.

In New Jersey, in the year 1887, 34 passengers, 101 employees and 152 trespassers were killed, and 144 passengers, 762 employees and 166 trespassers were injured. A table is given showing casualties classified according to the responsibility for the same, summarized from the reports of Massachusetts, New York, Pennsylvania, Michigan, Indiana, South Carolina, Missouri, Minnesota, Wisconsin and Kansas. The figures are generally for the years 1887 or 1886, and the total number of accidents to persons is given as 10,135. The proportions fatal and not fatal are not given. Of employees, 41 per cent. were killed or injured from causes beyond their own control, and of passengers 50 per cent. Similar statistics are given for Germany, Austria and Holland. In these countries the percentage of employees injured or killed from causes beyond their control was 15, 13 and 24 respectively, and in the case of passengers the percentages are 37, 41 and 90. The English employers' liability act of 1880 is given in full and the subject is discussed at length, with summaries of what has been done in the direction of extending the liability of employers in American states and in foreign countries. The relief associations of the Pennsylvania, the Baltimore & Ohio and other roads are described, including one on the Lehigh Valley which has been established 13 years and to which the railroad company contributes as much money as do the employees.

CONNECTICUT.

The 37th annual report is dated January, 1890, and embraces returns from railroads for the year ending June 30, 1889. The commissioners are George M. Woodruff, William H. Hayward and William O. Seymour. They summarize the railroad history of the state as having consisted of legislative contests for six months and attempts at adjustment to the situation by the roads for the next six. The only new railroad construction was the approach to the Thames River bridge. The capital stock of the companies reporting amounts to \$64,703,558, an increase of \$1,489,950. Funded debts amount to \$32,768,671, an increase of \$2,712,171. Gross earnings were \$19,486,878, an increase of 3.44 per cent. Freight earnings increased 2.45 per cent, and passenger earnings, 5.34 per cent. Operating expenses amounted to \$13,284,677, being 68.16 per cent. of the gross earnings and 6.21 per cent. less than the preceding year. Net earnings were \$6,210,205, being an increase of 32.77 per cent. over the previous year. Dividends averaged five per cent. The length of road in the state is 1,005 miles, of which 179 miles is double track. Gross earnings per mile were \$12,394, substantially the same as the previous year. Notes concerning the physical condition and other interesting points are given concerning each road. The Thames River bridge, the new station and change of grades at Hartford and extensive improvements on the Hartford & Connecticut Western are the principal points under this head.

The last legislature passed a law prohibiting any charge for delay to freight cars of less than four working days or for storage for less than two days. The New York & New England disregarded this, so far as interstate commerce was concerned, but it is said that the new General Manager has modified the demurrage rules to conform to the Connecticut law on all freight. Continuous car heating is briefly referred to, the conspicuous absence of anything of the kind on the New York, New Haven & Hartford and the Housatonic being the most salient feature of this part of the report. The law passed by the last legislature concerning separation of grades at crossings is regarded as not calculated to hasten the elimination of existing grade crossings. Its provisions are somewhat ambiguous, and no progress has been made. The number of crossings in the state protected with gates is 92, with flagmen 40, and with electric signal bells 40. Complaints regarding annoyance from locomotive whistles are diminishing, and the commissioners believe that the general adoption of the chime whistle would remove the chief ground for complaint.

Of the 503 engines on the 22 roads reporting, 374 are equipped with a train brake. Of freight cars 217 have the train brake and 661 have automatic couplers. Six passengers, 39 employees and 110 trespassers were killed; 60 passengers, 320 employees and 84 trespassers were injured. The derailment near New Haven, June 29, where an express train was thrown from the track by an insecurely spiked frog, was the only train accident in which passengers were killed. An appendix gives the laws of the state relating especially to railroads. The act establishing the Commission says that one must be a lawyer in good standing and one a capable and experienced civil engineer, each of ten years' practice; the third must be "a good, practical business man."

KENTUCKY.

The report of Commissioners I. A. Spalding, W. B. Fleming and J. F. Hager is issued for the year 1889. They have made a thorough personal inspection of the

roads; and they have also inspected the rolling stock "so far as their knowledge and limited means would permit." The railroads report neither fully nor promptly, and the Commission, though reluctant, will in the future insist upon compliance with the law in this respect. The neglect of the roads to give information about rates for hauling coal is interpreted to indicate a reluctance to let the public know what their charges are.

Mileage reports made by the companies are inaccurate, and every year corrections have to be made in previous records. The length of road in the state Jan. 1, 1890, was 2,832, an increase of 232 over the preceding year.

On 29 railroads, having 2,052 miles, the gross earnings for the year ending June 30, 1889, were \$11,400,906; expenses \$8,778,190; net earnings, \$5,833,177. The valuation of the roads as assessed by the commissioners is \$44,600,903, an increase of \$2,637,318 over 1888. A list of counties having railroads is given, and it is suggested that the Legislature order a compilation of a table showing the amount of indebtedness contracted by counties, cities, towns and districts in aid of railroad construction.

As returns are very incomplete, many of the statistics are of but little value. The average received per ton per mile on the leading roads varies from .75 to .30 cents. Estimating for the roads not reporting, the number of employees in Kentucky is given as 14,000, or five persons to each mile of road. Five passengers, 39 employees and 50 other persons were killed, and 40 passengers, 542 employees and 78 other persons were injured during the year. Automatic freight car couplers, train brakes and continuous heating are discussed. The report states that "a vigorous and persistent effort to 'repeal the Commission,' supported by a strong and numerous lobby of railroad officials and employees, was made by the railroads before the last legislature," and goes on to argue the necessity of a railroad commission for the proper protection of the rights of the public. The usual tables and reports of proceedings before the Commission are given, and an appendix gives the Inter-state Commerce law and abstracts of the laws of 22 states creating railroad commissions. This abstract appears in general to be accurate, though we notice that it is wrong as regards Vermont, where the account seems to be based on the old law, which provided for only one commissioner. The map of the state, accompanying the book, is on a scale of 10 miles to the inch. The principal systems of roads are shown in distinctive colors, and track laid in 1889, lines under construction and projected lines are clearly indicated.

Joint Inspection at Chicago.

The regular monthly meeting of the Western Railway Club was held in the club rooms, Phenix Building, Chicago, on March 18, 1890, with Vice-President Barr in the chair.

Mr. Peck, chairman of the committee on joint inspection of cars in Chicago, presented the following:

REPORT OF COMMITTEE ON JOINT CARD.

Your committee, appointed at a special meeting held at the rooms of the Western Railway Club, Jan. 21, 1890, to recommend a joint card and a set of rules to govern the use of such card, in order to facilitate the prompt handling of loaded and empty cars between the lines centering in Chicago, beg to submit the following:

1. The roads subscribing agree to the use of a "Chicago joint card," which may be applied by the receiving road for such old defects or mixed material that do not render the car unsafe to run or unsafe to trainmen.
2. The joint card shall be 3 1/2 x 8 in., yellow in color, with black letters, printed on both sides, and of the following form:

CHICAGO JOINT CARD.

(Name of Road.) Received..... Car No.
From..... Date..... 189
With following defects:.....

Fill in old defects or mixed material on both sides with ink or indelible pencil.
Attach this card securely to the intermediate sill between the two cross-tie timbers.

Chicago Inspector.

3. The "joint defect card" is to be used only in cases where the delivering company's inspector is located so far from the receiving road that it is impracticable to procure a regular M. C. B. card, or when the defects are of the nature explained in rule 1.

4. The card is to be filled out on both sides, with ink or indelible pencil, and to be attached securely to the intermediate sill between the two cross-tie timbers, and shall be removed by the company delivering the car, when the car is returned.

5. It is distinctly understood that this "joint card" is not in any way intended to conflict with the regular M. C. B. card. The railroad company issuing the card may be called upon to pay bills should any non-subscriber to these rules render them.

6. These rules shall be binding on each subscriber for six months from March 1; at the end of that time any railroad company may withdraw from the agreement by giving 30 days' notice of such withdrawal.

7. Any railroad company may become a party to these rules by notifying the Secretary of the Western Railway Club,

PETER H. PECK, C. & W. I. Ry.,

R. D. SMITH, C. & B. & Q. Ry.,

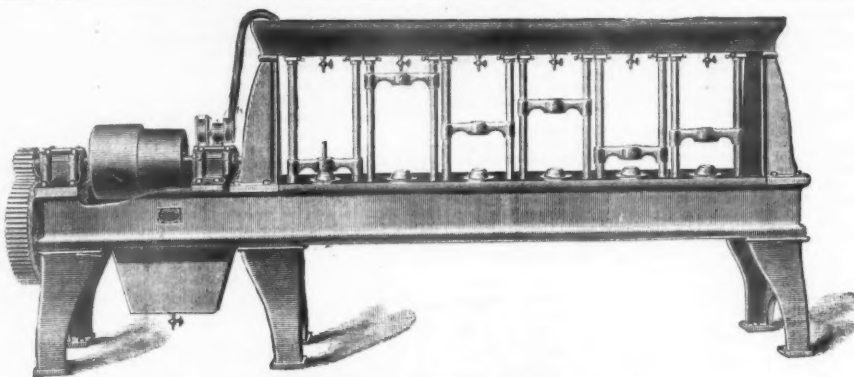
R. WHARTON, C. & N. W. Ry.,

Committee.

Mr. BARR: If by placing this card on a car we assume the responsibility for repairs, I do not see the difference between the use of this card and the M. C. B. card.

Mr. PECK: The object of the card is not to facilitate repairs; it is to get the freight through and the car back again.

Mr. BARR: Then if I should receive a C. B. & Q. car, and should put one of these cards on it, and a bill should be received against me, the C. B. & Q. would be responsible for the repairs on that car. Would the C. B. & Q. be willing to pay for repairs that we might be called



THE NICHOLSON STAY-BOLT THREADER.

Made by NICHOLSON & WATERMAN MANUFACTURING CO., Providence, R. I.

upon to pay for? I have thought a good deal about this matter, and my idea was this: that each of the railroads should hire a man to put in the other yards; that is, for instance, in the yard of the Milwaukee road, a man hired by all the other railroads should be placed and given authority to card for the other railroads; then all the other roads would be satisfied that that man was working in their interest, and that the card he puts on the cars was properly authorized by the other companies. Each man would not be at all under the authority of the road in whose yard he was placed, except that they would have the right to call attention to defects that they might consider cardable.

We use a green card, and the advantages are that at the inspecting points a record is made in a book of certain defects. These cards go out on our line, and we know that if they go back to Chicago they will be received by the parties delivering them. The green card is simply a memorandum to the inspectors on our line that the car is in such a condition that it ought to go back to Chicago. They don't always go back, but generally they do. The car having one of these cards carries along with it a record that it was received with certain defects, mixed drawbars, for instance. It is a private memorandum for our inspectors and trainmen.

Mr. RHODES: How do you get the car back to the Belt Line with mixed drawbars?

Mr. BARR: There is never any trouble about that, because they also have their memoranda, although the green card itself would be a testimony to that effect. We state on that card distinctly that it is not a Master Car-Builders' card; that it has nothing to do with it.

Mr. VERRBYCK: What I object to is that last part of the report, section 5. Why not leave that off entirely and say: "This card is only for transfer in the city of Chicago," and if that card should go to any point out of the city, then let them put on a Master Car-Builders' card. This card should not be one to make a bill on, in any manner.

Mr. PECK: It is not an M. C. B. card, but that doesn't make any difference; you can bill against them and get payment.

Mr. VERRBYCK: Many of these Master Car-Builders' cards have on them, "This is an old defect," or, "This is not a bill," and I am paying them every day. They have no right to put on such a card as that.

Mr. RHODES: If paragraph 5 were crossed out it would not alter the condition of things at all. The Committee want it clearly understood that they do not advocate anything that could be construed to conflict with the Master Car-Builders' rules. If the C. B. & Q. Co. put a record on any car as being received in bad order, and a railroad company makes the repairs and detaches that record and sends in a bill, the C. B. & Q. Co. will have to pay it.

Mr. BARR: I don't exactly see why.

Mr. RHODES: It has been so heretofore. You said that with your green card, not a Master Car-Builders' card in any way, you would expect to pay a bill.

Mr. BARR: No, you misunderstood me. I say that it is simply a memorandum. The card says specifically that the St. Paul Co. is not responsible, and I have almost in every case declined to pay the bill.

Mr. RHODES: I don't see then what protection railroads will have if their cars go off on other roads, and they are allowed to do that.

Mr. BARR: If we put one of those cards on a car, any road receiving it has a right to refuse that car, or receive it, just as they please. If they refuse it we have got either to put a Master Car-Builders' card on or send it back to the receiving point. Now, Chicago is a place where it is peculiarly objectionable to delay freight, and this simply removes the trouble. It is very seldom that we receive a bill on these green cards. There is no trouble about it; no company is compelled to accept a car with that card on, and we have our remedy by loading the car back to where we received it, and there we know it will be accepted. It is simply a memorandum of defects that were on the car when it was received.

Mr. R. D. SMITH: We had sample cards from all the roads in Chicago which were using such cards, and we tried to pick out the good features of all of them and condense them into one card. One thing that the committee did not agree on was the place where this card should be applied. Two of the committee were in favor of putting it on the intermediate sill between the cross-tie sills. Another member of the committee was in favor of putting it on the outside of the car, claiming that the card was simply intended as a record which would be kept on the books of the Chicago Inspector, and that it should be in plain sight, so that it would be more likely to be removed when it reached its destination and had performed the functions for which it was intended. As one of the committee I should not like to see any change in Rule 5, because I do not think we can afford to put on any card that would in any way interfere with the Master Car-Builders' card.

Mr. GRIEVES: I know that on our road we have had to pay bills on our white card that we are using around Chicago. The M. C. B. card, being white, also causes some confusion. If that is the case, I do not see any reason why we should not use the Master Car-Builders' card.

Mr. BARR: Not the slightest, if you pay the bills. I think every one connected with railroads centering in Chicago will agree with me that this is quite an important matter, and I believe it is gradually getting into shape. I think it ought to be brought into shape if we

stick at it three months longer. It is going to take considerable time.

The further consideration of this subject was postponed until the next regular meeting of the Club.

The Nicholson Stay-Bolt Threader.

Probably no class of bolts in ordinary use are so difficult to cut properly with well shaped, steam-tight threads and with correct spacing over considerable lengths as, the stay bolts used in locomotive boilers. With the ordinary means of cutting such bolts, the expansion due to the abrasion or the compression of the material by the dies is sufficient to lengthen the bolt considerably, and where the material is soft, such as is used in stay bolts, this difficulty is aggravated. Again, the heating due to cutting expands the bolts, with the result of leaving them too short when cooled. The machine shown is one which has been designed for the purpose of obviating as far as possible these difficulties, and with this a copper stay bolt can be threaded 18 in. in length without increasing the length or destroying the accuracy of the pitch. It has been adapted more particularly to locomotive boiler stay bolts.

In very long bolts, if the dies get dull, the heat produced by their action is sufficient to expand the bolt considerably, and when it cools again the pitch is inaccurate. In this machine the cut gear teeth produce a uniform and steady motion, and a rotary pump keeps the feed tank filled with lubricant for the dies. The spindle revolves at a slow speed, which prevents any sudden change in the size through heating by the dies.

The operator's time being divided among a number of spindles reduces the cost for attendance. Where the quantity of work will warrant, it is recommended to use half of the spindles for roughing and one-half for sizing, as a much smoother thread can be produced, which means a more perfect fit in the boiler sheets.

The manufacturers of this machine, the Nicholson & Waterman Manufacturing Co., Providence, R. I., have made many experiments with a view to producing a satisfactory stay bolt. They recommend instead of pickling the stay bolts in acids before they are cut, to remove the scale by the process of rattling, as used for small castings. The results of their investigations have been embodied in the following conclusions:

1st. That with the ordinary form of die, slow speed is absolutely necessary to accurate and uniform work.

2d. That the cheapest die is solid, split once for adjustment.

3d. That the best wearing results from dies are obtained by running saturated in oil, and with such an arrangement as to wash away the chips and dirt.

These machines are in use at the Rhode Island Locomotive Works, Schenectady Locomotive Works, and on the Pennsylvania, the Chicago, Milwaukee & St. Paul and other railroads.

Opinions Regarding Composition and Shape of Driving Box Linings.

Herewith are given in a tabulated form the opinions of 43 superintendents of motive power and master mechanics regarding the best composition and shape of driving box linings. This information was obtained by the *Northwestern Railroader* in answer to circulars issued. The subject of brasses and journals was up for discussion at the Northwest Railroad Club on Saturday evening, March 8. There will be noticed a preponderance of opinion in favor of the semi-circular, moon-shaped, crescent and circular (these all being synonymous terms) brass, put into position by hydraulic and other pressures, and held by dowels. There is little uniformity in opinion regarding the composition of brasses, as the first column shows. The difference of opinion given therein is very great, and a more harmonious series of replies might have been expected.

THE SCRAP HEAP.

Notes.

The general offices of the Northern Pacific Express Co. are to be removed from St. Paul to Chicago.

The Delaware, Lackawanna & Western has had long-distance telephones placed in its offices at New York,

OPINIONS ON DRIVING BOX LININGS.

Composition of brasses.	How put into driving box.	How held in position.	Form of Brass.	Road.	Master Mechanic or Supt. M. P.	Remarks.
1 tin to 6 copper	Hydraulic pressure.		Semi-circular, 1 piece.	Northern Pacific.	W. T. Small.	
1 tin to 5 copper.	Hand fitted.		Hexagon.	C. & A.	A. W. Quackenbush.	
1 tin to 8 copper.				T. P. & W.	W. B. Warren.	
1 tin to 6 copper.	Dovetailed Babbitt filling.	Dovetailed.	Sectional dovetailed.	M., L. S. & W.	John Hickey.	To each 100 lbs. of this mixture add zinc, $\frac{1}{2}$ lb.; lead, $\frac{1}{2}$ lb.
Hardy's neutral metal.				B., R. B. & L.	John Coglan.	
Tin, 25; copper, 100; zinc, 5.	Hydraulic pressure.			I. & G. N.	Frank Hufsmith.	
Tin, 7; copper, 64; zinc, 1.	3 parts—taper.	Brass dowels.	Semi-circular.	Main Central.	Amos Pillsbury.	
Damascus bronze.		$\frac{1}{4}$ in. brass dowel.		N. Y., P. & B.	A. Griggs.	
1 tin, 3 $\frac{1}{2}$ copper, 1 per cent zinc.	Hydraulic pressure, 12 tons.	Brass dowel.		D., L. & W.	Chas. Graham.	
6 copper, 1 zinc, $\frac{1}{2}$ lead.	Hydraulic pressure.			Gen. Vermont.	W. J. Robertson.	
1 tin, 6 copper.	Pressed or driven.			C. & N. W.	Wm. McIntosh.	
1 tin, 7 Lake copper.	Pressed.	Brass dowels.		N. Y., L. E. & W.	Ross Kells.	
1 tin, 5 copper.				K. & W.	W. Augustus.	$\frac{1}{2}$ lb. each zinc and lead to each 100 lbs.
1 tin, 6 copper.	Hydraulic pressure, 17 to 20 tons.	1 in. brass dowels.		Wabash.	J. B. Barnes.	
Phosphor bronze.			Octagon or hexagon.	G. R. & L.	S. D. Bradley.	
1 tin, 6 copper.	Pressed.	1 in. brass dowels.	Semi-circular.		A. S. Kimball.	Prefer scrap copper.
1 tin, 7 copper.				C. & E. I.	Allen S. Cooke.	1 lb. zinc to each 20 lbs. copper.
Damascus bronze.	Pressed.			L. E. & W.	P. Reilly.	
1 tin, 5 $\frac{1}{2}$ or 6 copper.	Hydraulic pressure, 20 tons.	Brass dowels.		C. N. O. & T.	Jas. Meehan.	Fluxed with lead.
1 tin, 7 Lake copper.				K. C., F. S. & M.	J. S. McCrum.	
Phosphor bronze.	Driven in.			N. N. & M. V.	O. A. Haynes.	
					W. T. Smith.	Copper, 75 lbs.—11 oz.; tin, 11 lbs.—3 oz.; lead, 13 lbs.—2 oz.; or, $\frac{7}{16}$ Banco tin, 12 Lake copper, $\frac{1}{2}$ lb. lead.
Phosphor bronze.						
1 tin, 7 copper.	Pressed.			R. & D.	R. D. Wade.	
1 tin, 6 copper.	Driven in.	Brass dowels.		B. & O. S. W.	Edward Evans.	
1 tin, 6 copper.	Pressed.			W. & N.	George Rommel.	
1 tin, 6 $\frac{1}{2}$ copper.	Pressed, 8 to 9 tons.			St. P. & D.	C. F. Ward.	
1 tin, 5 copper.	Pressed.			N. Y., S. & W.	W. C. Ennis.	
				N. P.	A. Bardsley.	With strip of Babbitt $\frac{3}{4}$ in. wide each side.
Phosphor bronze.	Hydraulic pressure, 10 tons.	$\frac{3}{4}$ in. brass dowels.		Eames Brake Co.	J. S. Turner.	
1 tin, 7 copper.	Pressed, 15 tons.	Dovetailed.		D., S. S. & A.	J. J. Connolly.	
1 tin, 7 copper.	Dovetailed Babbitt filling.		Dovetailed.	C. W. & N.	S. B. Tucker.	
Ajax metal.	Pressed.	$\frac{3}{4}$ in. brass dowels.	Semi-circular.	N. Y., L. E. & W.	J. H. Murphy.	
1 tin, 7 copper.	Pressed, 8 or 9 tons.			M. & O.	M. T. Carson.	
Phosphor bronze.	Dovetailed Babbitt filling.	Dovetailed.	Dovetailed.	D., L. & W.	W. H. Lewis.	
Copper and Ajax metal.	Pressed.		Semi-circular.	P. & R.	L. B. Paxton.	
Phosphor bronze.			Box solid.	Cumberland Valley.	Caspar Wicke.	
3 tin, 16 copper.		1 in. brass plug.	Semi-circular.	C. C.	Jas. Maglenn.	$\frac{1}{4}$ lb. zinc to each 19 lbs. of mixture.
15 $\frac{1}{2}$ tin, 77 $\frac{1}{2}$ copper, 6 zinc.	Pressed.			R. & A. and R. & G.	B. R. Harding.	
1 tin, 7 copper.				Ind. Car Mfg. Co.	C. E. Gore.	
1 Strait tin, 6 Arizona copper.	Driven.			Portland Loco. Works.	George F. Morse.	
1 tin, 6 copper.	3 parts—taper.	Brass dowels screwed in.		S. P.	T. W. Hintelman.	
1 tin, 8 copper.	Pressed.			N. Brunswick.	G. A. Haggerty.	
1 tin, 6 copper.	Pressed, 7 tons.	Brass dowel.		C. P.	R. Atkinson.	

Hoboken, Scranton, Buffalo and Syracuse, to expedite business between these points.

The Cincinnati, Jackson & Mackinaw has put on a number of train agents, who will collect the tickets and fares on passenger trains, though not regularly. They are to be placed in charge of trains at unexpected times and places.

It is stated in the newspapers that the Interstate Commerce Commission will not render any decision on the suit of Coxie Bros. & Co. against the Lehigh Valley Railroad Co., alleging discrimination in rates between anthracite and bituminous coal.

The Legislature of Ohio has passed a law making 12 hours a working day for railroad employees, and providing that after working 24 consecutive hours an employee shall not resume until after eight hours' rest. A fine of not less than \$500 may be imposed for each violation.

Among the companies which filed charters in Illinois last week was the Hoffman House and Hotel Richelieu Dining Car Co., of Chicago, which proposes to do a general restaurant and buffet business on railroad cars. The capital stock is \$100,000. The incorporators are S. H. Brown, General Manager of the Pullman Palace Car Co.; E. S. Stokes, of the Hoffman House, New York City, and H. V. Bemis, of the Hotel Richelieu, Chicago.

The report says: "By building viaducts Mr. Ripley does not mean the company shall pay land damages or construct the approaches. It will be responsible only for superstructures and abutments. The company also proposes to build only two viaducts each year, and in cases where the tracks are paralleled by those of other companies to build only half of the superstructure, half the centre pier, and the abutment. The letter was referred to the Railroad Committee."

A communication has been received by the Chicago city government from E. P. Ripley, of the Chicago, Burlington & Quincy Railroad in reference to viaducts. He proposes in behalf of his company to build viaducts over every third street along the right of way of the road from Stewart to Western avenues (those already erected being taken into account) on the following conditions: (1) That the company be given an unlimited right of speed; (2) that the streets between those viaducted be vacated or inclosed; (3) that the railroad company be given permission to put in subways instead of viaducts if that policy is expedient.

High water continues in the Ohio and Mississippi rivers. On Sunday the Pittsburgh & Western tracks were covered with water for a distance of 6 miles near Pittsburgh. The severity of inundations of railroads along the lower Mississippi Valley is not definitely reported, some roads being apparently free from overflow yet totally blocked by a few washouts, while others are submerged for miles and yet are running some trains. The Louisville, New Orleans & Texas has suffered by the Nita crevasse to such an extent that it will take a week or more to build a trestle to carry its tracks. The Memphis & Little Rock track near Forrest City, Ark., was fastened down by wires to hold it in place in case of inundation.

Bridge Accidents.

The Spartanburg & Union Railroad Bridge over Broad River, near Columbia, S. C., was floated off its abutments, and broken to pieces, by a flood accompanying the severe storm on the 22d. A partially completed bridge of the Philadelphia & Reading over the Schuyl kill at Manayunk, near Philadelphia, was carried away by high water on Sunday. A highway bridge at Hattiesburg, Miss., was carried away by a jam of logs on the 17th.

Tragic Garnet.

A Georgia paper reports the following: "While Miss Daisy Garnett was walking along the track of the Central of Georgia, at Whitehouse, Ga., on the night of March 15, she discovered a broken rail. The village is inhabited by only a few people, and at this hour not a man, woman or child could be found. The brave little lady knew that it was about time for the passenger train from Augusta, and that if the train struck the broken rail there would be a disastrous wreck. Her cries for help failed to attract any response, and she decided to signal the train. As soon as she saw

the train she began to swing her lamp. The engineer saw the signal, stopped, a purse was made up, and so on. The stars are inserted in place of some of the flowery rhetoric characteristic of tropical climates, and to mark the hiatus where the cold and critical reader looks in vain for an explanation of how and where the maiden got her lamp.

Percentages.

An esteemed "railway" contemporary states that out of the 1,050,000 freight cars in this country, about 50,000 are now equipped with the M. C. B. coupler, and adds: "So it appears that the total number of cars having Master Car Builders' couplers is barely one-half of one per cent. of the number of freight cars in the United States alone." This small percentage causes the editor to take two columns of mournful view. When the President and Manager of our esteemed contemporary discovers that the percentage is ten times as great as stated, it is to be hoped he will not discharge his man and thereby reduce his editorial force by 100 per cent.

Talk of a Railroad Commission in Louisiana.

A conference was held at New Orleans on March 21 to discuss the desirability of establishing a state railroad commission in Louisiana. The Board of Trade, the Cotton Exchange and the Sugar and Rice Exchange, together with similar bodies from other cities, were represented. Most of the speakers were in favor of a commission, though some of them referred to the "great curse of too much legislation" from which Louisiana is suffering, and the movement was regarded by one man as reflecting on the judiciary, which he held to be sufficient to do justice as between shippers and railroads. Many instances of alleged unjust discrimination on the part of the railroads were brought out, one of which was that the rates on Louisiana rum are higher than those on Cincinnati whiskey.

Pullman Cars for Australia.

Mr. W. Pullman is in Australia trying to introduce the Pullman car, but his terms have not been accepted. He asks for 60 per cent. of the gross receipts.

Wreck on a Trestle.

On the 13th inst. a trestle bridge on the Georgia Pacific, about 50 miles from Birmingham, Ala., known as the Horse Creek Trestle, gave way under a freight train. Twelve cars went down with the bridge and were set on fire, as is said, from the stove in the caboose, and the cars and trestle were burned. We are informed that the accident was undoubtedly caused by a break-down of a truck. The car under which the truck broke was thrown from the track and fell over, dragging after it the other cars in the rear. This was the statement of an eye witness, and also of the conductor, who was in the turret of the caboose overlooking the train when the accident occurred. The trestle was erected 2 $\frac{1}{2}$ years ago. The floor system consisted of ties 7 in. x 9 in., 10 ft. long, spaced 15 in. centre to centre, with a guard rail the same size. The stringers were 8 in. x 16 in. The bents were 15 ft. centre to centre, of 12 in. x 12 in. timber. It is said that there was no weakness of the structure and that the accident was one that might have occurred to any trestle.

Legislation for Safety.

In our issue of March 14 we stated that Mr. L. S. Coffin, of Iowa, had succeeded in getting the Legislature of Mississippi to memorialize Congress in favor of legislation for safety appliances for the protection of railroad employees, and that he hoped to get a similar memorial through the Legislature of Iowa this spring. This statement was made on the authority of press dispatches. Mr. Coffin informs us that such a memorial had already passed the General Assembly of Iowa, and has been presented in Congress by the representative from Dubuque. A bill has been introduced into the House and passed the House Committee on Railroads, and has been reported back with recommendation that it be passed.

Southern Irons.

Concurrently with the news of a shipment of 5,000 tons of pig-iron from Sheffield by the Tennessee River

to Pittsburgh, and other Ohio River points, statements have appeared in various papers to the effect that Southern irons were not of a sufficiently good quality to justify their use for merchant irons. The *Manufacturers' Record*, in answer to this assertion, reprints a dispatch from the Ohio Falls Iron Works, of New Albany, Ind., from which it appears that these works have just completed a contract for bar iron, from the brand of iron under consideration, which was to stand a tensile strain of 30,000 lbs. per sq. in. and an elongation of 20 per cent. on a length of two inches. In some cases the breaking strain was over 50,000 lbs., as tested in Chicago. One sample was sent to Pittsburgh, and the report was: "Elastic limit, 30,410 lbs.; tensile strength, 51,650 lbs.; elongation in two inches, 25 per cent.; reduction of area, 21.60 per cent.; fracture fibrous with five per cent. crystals."

A Railroad Commission for New Jersey.

A meeting was held in the Executive Chamber at Trenton, March 24, to consider the question of freight charges by railroads as they affect the farmers. Governor Abbott and others were in favor of having a railroad commission, and a bill will be introduced for that purpose. Senators Smith and Roe and Assemblyman Klotz were appointed a committee to investigate the freight rates in New Jersey and other states.

Rails to Mexico.

Consul-General Sutton, at Nuevo Laredo, Mexico, has reported to the State Department that 25,000 tons of American steel rails have been recently imported into Mexico for use in the construction of the Monterey & Mexican Gulf Railroad. He says the President of the road informed him that the cost was less than that of European rails of the same grade.

"The Saloon Must Go."

President Corbin, of the Philadelphia & Reading, has issued the following order:

"All superintendents will be held strictly responsible for the enforcement of the rule relating to the use of intoxicating liquors by employees. Men who violate it must be promptly discharged, and proof that a man goes inside a drinking place while on duty will be ample evidence to warrant his dismissal. Men known to drink to excess or to frequent drinking places while off duty must be discharged. When employing new men strict inquiry should be made as to their habits and preference always given to those who do not use intoxicating liquors at all. Heads of departments must keep informed as to the habits of the men under them and make sure that these rules are strictly observed."

The following circular affecting the habits of employees has been issued by General Manager St. John, of the Chicago, Rock Island & Pacific: "Persons known to be in the habit of becoming intoxicated must not be taken into the service of this company. Station agents, yard, train and engine men, telegraph operators, clerks, and others who are known to frequent drinking places should be warned that they must stop it at once if they desire to remain in the service of this company. If known to have been intoxicated, either on or off duty, they will be discharged. No person discharged for intoxication shall be re-employed."

Abandoning Railroads in Iowa.

A decision has been rendered in the District Court at Fort Dodge in the case of the State of Iowa vs. the Chicago, Rock Island & Pacific. This suit was brought by the state to enforce the order of the State Railroad Commission, commanding the Rock Island to rebuild its dismantled track into Fort Dodge. The decision of the court sustains the ruling of the Commission, and decrees that the company must build a track into the city before Aug. 15, 1892. The road was originally built by a state land grant, the company agreeing to build and maintain a road into Fort Dodge. Afterward the company changed hands. The track from Tara to Fort Dodge was torn up, and a leased line operated in its stead. The city complained to the Railroad Commission, which ordered the road to rebuild its track. The road refused to obey the order, and the state brought suit to enforce it, with the above result. The railroad company will appeal.



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EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

In another column we give in tabular form the opinions of 43 master mechanics regarding the most advisable form of and composition for linings of driving boxes for locomotives. This table is instructive beyond what might appear at first sight. There is such a preponderance of opinion in favor of the semi-circular form of brass and the method of inserting it that one may conclude that such a form is the favorite and that it gives good results in service; but with reference to the composition there is no such unanimity, the difference being greater than one might expect. This subject is one well adapted for the consideration of the Master Mechanics' Convention at the coming session, because it is one that can be readily handled. There are testing machines which could be put to work upon brasses of various compositions to determine the variation in wearing quality and friction under a constant supply of a standard oil of some selected grade, and which would give results indicative of the different characters of the various bronzes which are recommended by these 43 railroad men. Such a subject as this can be best investigated in a laboratory because it is very difficult to form conclusions directly from locomotives, owing to the variety of conditions under which they are worked and the liability to the presence of grit in one case, and freedom from grit in a case otherwise comparable. If a committee could be appointed at the next convention which would set to work immediately to investigate the wearing qualities, friction, and liability to heat of the various compositions recommended, they could, before another year, make returns which would be of value, and possibly bring to light knowledge that would warrant a recommendation of limits of proportions of the different ingredients which should not be exceeded; that is, they could recommend that brasses be not used harder than a certain composition, or softer than another composition. They could determine within reasonable limits the value of zinc in different mixtures, and the effect of lead when introduced into the composition, the relative values of the patent and special bronzes which are now advertised, and the differences between Arizona, Lake, and other coppers could also be determined. Probably the most interesting, and may be the most useful, recommendation which the committee could make would be with respect to the effect of the introduction of babbitt and like compositions in sectional parts into a driving box lining.

The decision of the United States Supreme Court in the cases of the Minneapolis Eastern Railway against the Railroad and Warehouse Commission of Minnesota, and the Chicago, Milwaukee & St. Paul Railway against the same, is of much more than ordinary im-

portance. The commission had, without a hearing, made an order fixing \$1 per car as a maximum switching charge in Minneapolis, and had fixed 2½ cents per gallon from certain points, at different distances, as the price for carrying milk in ten-gallon cans to St. Paul or Minneapolis. The railroads claimed that this action was unconstitutional, depriving them of their property without due process of law. The Supreme Court of Minnesota decided against the Railroads; the U. S. Supreme Court has decided in favor of the railroads, and against the constitutionality of the procedure fixing the rates. Justices Bradley, Gray and Lamar dissented. There are many precedents to be quoted on both sides. The majority can point out the unfairness of allowing a legislature, by itself or through its delegates, to fix the earnings of a business without giving the courts any chance to decide whether such arbitrarily fixed rates are fair or not; and can show cases where the courts have looked at the matter in that light. On the other hand, the minority can show an almost equal number of cases where the legislature has actually assumed the power here called in question. This divergence of precedents is explained by the fact that, until recent times, it made comparatively little difference which alternative was chosen. If the state or the city, by the exercise of its police authority, fixed hack fares unreasonably low, some of the hack drivers would go out of business. The number of carriages being thus reduced, those which remained would earn as large profits as before, owing to the more constant demand for their services. This could go on until the scarcity of carriages was felt to be a worse evil than the high rates had previously been; in this case the community could protect itself by repealing the ordinance. There was no special need for a court to decide upon the reasonableness of the rate, for the adjustment of trade would take care of that. In the case of a railroad there is no such speedy adjustment. If rates are made too low, it is impossible for the railroads to withdraw from business without enormous loss. Even if they wish to do so, the state authorities have contested their right to adopt such a policy. The road has thus no protection against unreasonable reduction; and an act which strives to impose such rates without allowing the courts to decide whether they are reasonable does in fact afford an opportunity for injustice such as could not have existed fifty years ago. Under these circumstances we believe that the view of the majority of the United States Supreme Court is more in line with the business needs of to-day than that of the minority. Even though past precedents may be more or less equally divided, we believe that future precedents will be on the side of judicial rather than legislative determination of rates.

High Speed Indicator Cards and Approximate Train Resistance.

The highest speed indicator cards ever taken from a locomotive are illustrated in another column. Aside from the curiosity which these diagrams excite because of their novelty, there is much in them to interest locomotive men. The uniformity of the lines and the smoothness of the expansion curves are remarkable. Mr. Worsdell states that these cards are just as taken. In the case of card No. 7 the revolutions per minute were about 309, which is at a speed of 86 miles per hour.

The action of the locomotive as shown by these cards is satisfactory in a high degree. At a speed of five miles per hour with a cut-off at 78 per cent. in the high-pressure cylinder and at 63 per cent. in the low pressure, the expansion of the steam is 3.2 times as indicated by the theoretical line. With a single expansion engine the expansion would have been about 0.7 at the same cut-off as in the high-pressure cylinder. This is not all gain, however, because the actual expansion line, as seen on the combined card, does not coincide with the theoretical, but falls below it; the advantage is considerable, nevertheless. The back pressure and compression on the cards up to 30 miles per hour are small, and this fact probably illustrates the advantage of what may easily be considered to be nearly the best possible combination of the Joy radial valve gear, a well selected inside lap and large steam and exhaust ports.

The clearance in the high-pressure cylinder is 8.7 per cent., and in the low-pressure cylinder it is 5.3 per cent. This is not a large clearance, and yet the compression line on even the high-speed cards is quite acceptable. However, it will be noticed that the peculiar manner in which the engine is run at high speed has much to do with the satisfactory shape of the compression line.

On card No. 7 the cut-offs are seen to be at 53 and 70 per cent., which has the effect of permitting a wide

steam port opening and a late exhaust port closing, thus placing the gear in the best position to run at speed. The variation in power required is, in such cases, better obtained by wire-drawing the steam either at the throttle or elsewhere, as clearly indicated by cards Nos. 6 and 7.

Card No. 5 was taken at 50 miles per hour, and at a cut-off of 40 and 62½ per cent. At these cut-offs the compression became considerably increased, as shown on the card from the high-pressure cylinder; and it is evident that shorter cut-offs than this are not advisable with the valve gear used. The same is true of the Stephenson link to a greater degree even than the Joy, and for satisfactory work with a high-pressure cylinder the ordinary Stephenson link gear must be used to cut off but little, if any, less than the 40 per cent. here shown. It will be noticed that after card No. 5 the cut-off had to be increased in order to maintain the desired mean effective pressure, because of the increasing back pressure and compression resulting from a valve gear that closes the exhaust port too early for the high-pressure cylinder.

Aside from the interest that one naturally feels in the shape of cards at such high speeds, there is not a little curiosity to learn the horse power required to drive, and the resistance offered by a train at a speed of 86 miles per hour. There are, of course, not sufficient data to draw exact conclusions, and, perhaps, not to prove anything; but deductions will show at least what may be expected as a resistance at the higher velocities, and furnish ground for interesting speculation.

In this case the train load was 347½ tons total, including engine and tender. The following table deduced from the indicator cards gives the speed, horsepower and the actual pressure on the end of the train required to move it at the speeds given, a reduction being made of 10 per cent. for the internal friction of the engine.

Number of card.	Horse power.	Pressure required to move the train less 10 per cent. for internal friction of the engine.	Speed in miles per hour.	Resistance per ton of total load.
		Pounds.		
1.....	136	9,180	5	26
2.....	438	8,672	17	25
3.....	498	7,305	23	21
4.....	630	7,087	30	20
5.....	662	4,468	50	12.9
6.....	1,041	4,684	75	13.5
7.....	1,069	4,195	86	12

These figures show a decreasing resistance as the speed increased, but are not to be taken as conclusive proof that such is the case. What is shown, however, is that the resistance at a speed of 86 miles per hour is not so stupendous as some writers would have us believe, and it does show also the fallacy of much that has been written to recommend a sharp prow on the locomotive, and other devices supposed to be able to reduce the effect of wind resistance, oscillation, etc. To come down to the bare facts, here is a train weighing 347½ tons rushing along on a level at a practically constant speed of 86 miles per hour, and which is maintained at that speed by the constant generation of 1,069 horse power in the cylinders. This indicates, if it does not prove, that the train in question required 4,195 lbs. to move it after deducting 10 per cent. for the internal friction of the locomotive engine. This is at the rate of 12 lbs. per ton of load, which is not a large figure for trains at a much lower speed, as determined in some American tests. If now 5 lbs. per ton be allotted for friction of the journals and all resistances other than the head air resistance, there will remain 7 lbs. per ton, or a total of 2,430 lbs., that might, without a great stretch of the imagination, be allotted to the head air resistance. If the area of the front part of the train be taken at 90 sq. ft., the pressure per square foot is derived as 27 lbs.—a not unreasonable figure, in view of the latest experiments in wind pressures. As has just been said, this proves nothing, but remains as an interesting speculation leading up to a belief that the total resistance of trains at high speeds and the resistance of the air are not such formidable obstacles to higher train velocities as some writers would have us believe. Not long since one of them stated 80 miles per hour as the ultimate attainable speed. It is indeed regrettable that experiments have not yet been made in this field of railroad operation that lead to a few definite and accurate conclusions.

Railroad Charges in Different Countries.

A German newspaper has recently collected statistics with regard to the average receipts for the transportation of freight and passengers of different

countries in continental Europe. The results, reduced to American standards, are as follows:

	Per passen- ger mile. Cents.	Per ton- mile. Cents.
Belgium, 1887, private roads.....	1.19	1.49
" " state ".....	1.32	?
Holland, 1887.....	1.54	1.24
Prussia, 1887-8, state roads.....	1.22	1.43
Other German roads, 1887-8.....	1.29	1.69
Austria, 1887.....	1.54	1.85
Italy, 1887.....	1.39	1.75
France, 1887.....	1.39	1.77
Norway, 1886-7.....	1.37	2.24
Sweden, 1885.....	1.07	2.19
Switzerland, 1887.....	1.63	2.06

To this we may add, for purposes of comparison, the following American figures:

	Per passen- ger mile. Cents.	Per ton- mile. Cents.
New England, 1888.....	2.01	1.52
Middle, 1888.....	2.02	0.83
Central Northern.....	2.14	0.81
South Atlantic.....	2.82	1.19
Gulf & Miss. Valley.....	2.48	1.08
Southwestern.....	2.51	1.47
Northwestern.....	2.50	1.21
Pacific.....	2.47	1.89
Whole United States.....	2.25	0.98

For England and most of her colonies no ton-mile or passenger-mile figures are given, so that no accurate estimate can be made. The average English receipt per passenger mile is assumed by Mr. Dorsey to be 2½ cents; we think that two cents would be nearer the truth, but possibly a shade too low. The average earnings per ton mile also cannot vary greatly from two cents.

No notice of these topics would be complete without giving the extraordinary results obtained in British India. The figures for 1887 are as follows, counting the rupee at 40 cents (which is higher than its present value):

Average per passenger mile	0.54 cents.
" " ton mile.....	1.36 "

At the present quotations for silver, the average fare per passenger mile would be decidedly less than half a cent!

When we come to inquire as to the cause of these differences, we find them easier to explain than appears at first sight possible. Not that any one cause or any number of assignable causes can completely account for them; after every allowance has been made there is always something in the difference of price levels in different countries which baffles explanation. But this unexplained element is not large. Most of the difference is easy to account for. On freight it is due in large measure to difference in length of haul; on passengers it is due partly to quality of service, and partly to density of population, the last being the most important factor.

It is the relative shortness of the haul more than anything else which gives English railroads the appearance of charging such high rates for freight. No direct data are available for determining the average English haul; the estimates vary between thirty and fifty miles. There seems to be good reason to believe that the true figure is rather under than over 40 miles. This fact, together with the services assumed by the English roads in the way of cartage, and the high speed at which many of their freight trains are necessarily run, is sufficient to explain the high rates prevailing on English railroads. In Germany and Austria the haul averages somewhat under 70 miles (Jeans' figures on the subject are worthless), corresponding naturally enough to a somewhat lower rate per ton-mile. In Holland, the exceptionally low rate is due partly to the large transit traffic which the Dutch roads have developed, and partly to the fact that there is more active competition for business in Holland than in other parts of Europe. The same results are seen in the United States. Our longer haul (111 miles—Poor's figures for 1888 are wrongly added up) has directly and indirectly produced a much lower general rate; while the districts with the very lowest average are those which have a large share in the transit trade.

In passenger business the differences in service rendered count for a great deal. The relatively high mileage rates in England and America are balanced by greater speed and comfort, the former being specially prominent in England, the latter in the United States. The high rates in Switzerland and Norway are obviously due to the natural disadvantages to be overcome. The absence of these exceptional services will account for the low rates in many other parts of the continent, though it must be confessed that the

exceptional results in Prussia are much better than these causes will account for and highly creditable to this department of the administration.

The effect of dense population upon passenger economy is best seen in India. In spite of the absurdly low passenger rates, the train-mile results are on the whole better than those in the United States. The train loads are enormous. With less than one-tenth of our mileage and train-mileage, the passenger mileage is more than one-third of ours. The average passenger train-loads seems to be about 160, against a little over 40 in the United States. On individual systems the results are in many instances much better. Thus the East Indian Railway reports an average train-load of 263; the Madras Railway, 293; and the Tirhoot Railway, a narrow gauge line, 239. The two latter roads charge on an average less than four-tenths of a cent a mile; yet the train-mile receipts amount to about a dollar for the Tirhoot and \$1.35 for the Madras. The East Indian, charging about six-tenths of a cent, has train-mile receipts of \$1.65 (counting the rupee at 40 cents). If we note, besides these enormous loads, the additional fact that the passengers are almost all fourth class, carried at slow speeds and with the very rudest accommodations, we shall see how the low rate becomes not merely possible, but natural.

Conciseness vs. Perspicuity.

A correspondent writes criticising the instructions given on page 40 of the Standard Code, which are intended to explain form C of the train orders. This form is for giving a train of inferior right the right of track against an opposing train of superior right, and reads, "No. 2 has right of track against No. 1 Mecca to Mirbat." The explanation is:

"Under this order, if the train of superior right reaches the designated point before the other arrives it may proceed, provided it keeps clear of the schedule time of the train of inferior right as many minutes as the inferior train was before required by the train rules to keep clear of the superior train."

This the conductors and engineers do not readily comprehend. Our correspondent, who is a superintendent, does not say but that he understands it clearly himself, but wishes to know the experience of other superintendents in teaching this point to their trainmen.

The object of the paragraph quoted is, simply, to convey the information that train No. 1 will not run ahead of time. Form C simply reverses the positions of the two trains as regards their right of track. The way to make this clear to men who get muddled on it is to print a clear example of a movement, under this form, on their own division. For example, take the time-table of the Dayton & Union, on page 169 of the *Official Guide* for March.* Let us assume that train No. 5 has the right of road between Dayton and Union City, and that it is desired to give train No. 18 this right for a portion of the distance, taking it away from No. 5, the latter being unable to start on time. The dispatcher is not informed how late it is likely to be, and so cannot make a definite meeting point. In order not to delay No. 18 he uses form C, saying "No. 18 has right of track against No. 5, Union City to Air Hill." We will assume that the latter place is an important junction and that No. 5 must get there as quickly as possible; that it would be as bad to hinder 5 as to hinder 18 up to this point.

Now, if No. 5 gets to Air Hill at 6:52, stops two minutes, and is ready to start at 6:54, it can, by its schedule time, reach Brookville at 6:59 and clear No. 18 five minutes, which we will assume is the required clearance. The paragraph in the code is simply to assure the conductor and engineer of No. 5 that they have this right. Another way to word it would be

"Under this order the train of inferior right will not run ahead of time, and the train of superior right can run accordingly." Or

"Under this order No. 2 must not run ahead of time; No. 1 can govern itself accordingly." Or,

"Under this order No. 1 will keep out of the way of No. 2 in the same way that No. 2 kept out of the way of No. 1 before the order was issued; but No. 2 must take the side track, according to rule 85, the same as before."

The Standard Code is necessarily brief. To get an agreement upon it among such a variety of minds many desirable points had to be omitted. But the conciseness of its language becomes a difficulty with un-ratiocinative minds, and every superintendent and trainmaster should be prepared with clear and simple ex-

"DAYTON & UNION RAILROAD."		
No. 5.		No. 18.
5.40 p. m.....	Dayton7.35 p. m.
6.13 p. m.....	Air Hill7.10 p. m.
6.18 p. m.....	Brookville7.04 p. m.
6.43 p. m.....	Gordon6.43 p. m.
7.45 p. m.....	Union City5.50 p. m.

planations by which he can answer inquiries from his men on a moment's notice. Not only this, the men must be compelled to present the inquiries. The above explanation may seem long and unnecessary, and many will say that if all the rules were treated in this way the rule-book would be too large for an overcoat pocket. But suppose it were; is not this easier than to explain it to every man orally? And is it not better than to remain in doubt as to whether the rule is clearly understood by all?

Accidents and Casualties on American and English Railroads.

A correspondent asks our opinion of the statement, recently made in his hearing, that there are three times as many railroad accidents per mile of road in the United States as there are in England. We assume that train accidents are meant. It is probable that the statement has, in fact, a substantial basis of truth, but that the one who made it was in possession of any accurate information concerning this basis is very much doubtful. The British Board of Trade compiles the reports made to it by the companies. The *Railroad Gazette* reports American accidents so far as it can gather accounts of them from the newspapers and from correspondence with officers of railroads and others. This affords a very inadequate basis for anything like an exact comparison. A correspondent once sent us some figures showing that we had published reports of only about one one-hundredth of the accidents on a certain road. Moreover, it is difficult to tell what is an "accident." A slight collision which breaks one drawbar may kill a man, and thus be published and get into the reports, while a hundred similar cases in which no personal injury is done, and the loss is small, are never heard of. Even the English reports depend upon voluntary returns from the companies, and the railroad managers doubtless often decide according to their own standards what to report and what to suppress. Our reports for the year 1888 showed a total of 800 collisions and 1,000 derailments on 156,000 miles of road. We give round numbers, as they are more easily remembered, and accuracy is unattainable in any event. The English reports cannot well be compared with ours, for the reason that they are classified differently; but, roughly speaking, there were in the United Kingdom, in that year, 100 collisions and 64 derailments. Failures of axles and of rails were numerous and caused some injuries, but there is no information as to how many derailments were caused by them. Estimating the number at 36, and adding it to the 64 derailments just mentioned, we have 100 derailments for the year. The railroad mileage of Great Britain was approximately 20,000. From these figures it will be seen that the number of collisions was, in Great Britain, one to 200 miles, and in the United States, one to 195 miles. The number of derailments was, in Great Britain, one to 200 miles, and in the United States one to 156. We omit mention of "Other Accidents," such as boiler explosions, broken parallel rods, etc., as a comparison would be still more vague than in the two classes above set forth.

But a comparison by miles of road is not fair. Train mileage is the more correct basis. In the year referred to our train mileage was 689 millions. That of the United Kingdom was about 300 millions. Comparing our 800 collisions with their 100, and our 1,000 derailments with their 100, it will be seen that on this basis the statement quoted by our friend is well within the truth. As the English reports are official, and presumably very much more complete than ours, the comparison grows more unfavorable to the United States the more one studies it.

Our Interstate Commerce Commission has made a beginning of gathering official reports for this country; and for the year ending June 30, 1888, has gathered statistics from 93 per cent. of our railroad mileage of the persons killed and injured. These figures can be compared with those of Great Britain with some show of accuracy, though it is impossible to go into details so long as our reports make no classification of causes. Moreover, the causes of injuries, other than those incident to train accidents, are so various that the totals bear a somewhat remote relation to the questions of careful management and the responsibility of railroad companies and officers. We give, however, a few figures, which will possibly be of use to the speculative theorist, if not to the practical reformer or the historian.

	Year 1888.	
	United States.	United Kingdom.
Mileage of Railroad.....	156,081	18,687
Passengers carried, millions.....	451.4	882.8
Passengers killed.....	315	107
Passengers injured.....	2,138	1,408
Employees killed.....	2,070	396
Employees injured.....	20,148	2,193
Other persons killed.....	2,587	402
Other persons injured.....	3,602	225

*Open for passenger traffic.

The proportion of passengers killed in the United States was one to 1.4 million carried, and in the United Kingdom one to 8½ millions. But the number of passengers killed in train accidents was very much less; in the British reports only 11 out of 107 come under this head, which is equal to one out of every 80 millions carried. The *Railroad Gazette* train-accident record for 1888 shows 108 passengers killed, which is equal to one in every 2.7 millions carried. While, as before remarked, these comparisons are by no means without interest, it

is proper to add one further caution, and that is that the records of different years vary widely. For instance, the Armagh disaster will make the record of Great Britain for 1889 very bad as compared with the year above quoted; and yet the Great North of Ireland is really an exceptional road, and the occurrence of that collision by no means alters the fact that substantially all the roads of England and Scotland have adopted safety appliances and methods to a much greater extent than has been done in any other country. The number of passengers killed in this country in 1888 was swelled by the Mud Run, Blackshear, Locust Gap and other bad disasters, which it is to be hoped will not soon be repeated.

The abolition of the grade crossings at Elizabeth, N. J., has been under consideration for several months by representatives of the Pennsylvania, the Central of New Jersey and a special committee of the City Council. The matter was first thoroughly discussed by the Board of Trade, and the public interest thus crystallized led to its being taken up by the Council. Various plans were suggested, and the engineers of the Pennsylvania took an active interest in the work. The first proposition, by which the Pennsylvania track was to be elevated, leaving the Central as it now is, was not acceptable. The city wanted the whole loaf. The later plans, which are reported favorably by the special committee, and have been approved by both railroad companies, abolish every grade crossing in the city with one exception, and even this can be readily discontinued. The entire cost of the changes will be about \$1,000,000, and will be borne by the railroad companies. A new station will also be erected by each. The Pennsylvania roadbed will be raised about 18 ft., the Central remaining as it is at the crossing, but gradually elevated eastward, the streets of the city being depressed where necessary to secure sufficient clearance. The plans were indorsed by the Board of Trade March 24, and will come up for acceptance by the Council on the 28th. The indications are that they will be approved, as they embody the ideas of the City Engineer, and involve no expense to the public. It will take about two years to complete the work, with the exception of the raising of the Central tracks east of the crossing, the time for which will be extended an additional two years. Elizabeth may apparently regard herself as exceptionally fortunate. As in nearly every old community, a portion of the burden of making a change of this sort undoubtedly should be borne by the municipality, but the railroads here have such pressing difficulties confronting them that they are compelled to take action. The delays and expense of slow running for street crossings and stopping for the railroad crossing are onerous on both fast passenger trains and the slow freights, and both roads have a large number of both classes of trains. The railroads' necessity is the city's opportunity.

We have received from Messrs. Hick, Hargreaves & Co., Engineers, Soho Iron Works, Bolton, England, a photograph of the largest Corliss engine which has ever been built. It is of the vertical type, and stands 48 ft. high. It was photographed lying on its side owing to lack of room vertically to erect it. This engine has been designed to drive directly large dynamos, which are 45 ft. in diameter, on the Ferranti system, at Deptford, near London, and which are to supply a current at a pressure of 20,000 volts. The dynamos are not quite ready for the engines, but soon will be. This engine was erected on its side, but the Soho Iron Works are building a large shop which will take such engines in the future. The clear height under the traveling cranes will be 50 ft. These engines stand 48 ft. high. Mr. William Inglis, Engineer of the Soho Works, writes: "We are slow folks over here compared with the United States, which accounts for the long time in building these big dynamos." However, this hardly appears from the character of the work which we have just described, because the people who are forwarding this undertaking, which has for its object a direct-driven dynamo 45 ft. in diameter, and driven by a pair of vertical Corliss engines of 5,000 horse power each, of which the parts are so large that the bolts for the straps on the connecting rods are 9 in. in diameter, can by no means be called "slow folks." In the photograph sent there appears an ordinary horizontal Corliss engine of 1,000 horse power, and a comparison between the two shows the enormous dimensions of the 5,000 horse power machine. These engines, aside from their dimensions, are interesting as being destined to take no small part in a plan which, if successful, will put an entirely new face on the question of the distribution of power over a large area by means of an electric current of high pressure sent out from a distant generating point.

The New York Railroad Commissioners have made a report on the Bay View accident on the Lake Shore & Michigan Southern. They find "reckless culpability" on the part of the conductor in leaving Dunkirk without replacing the air-brake connection or until the safety-chains had been securely refastened or other chains supplied. Further they say that, inasmuch as he did leave Dunkirk with the rear cars in the condition they were, he should at least have notified the sleeping-car conductor and porters and rear brakemen of such fact, so that they might have been on the lookout. "His conduct throughout is more remarkable from the fact that

he is a man 62 years of age, has always borne a good reputation as a careful conductor, and has never before met with a serious accident to his train. The Board is also of the opinion that Engineer Edward P. Mooney showed bad judgment in leaving the station, inasmuch as Houghtaling had informed him that there was no air on five cars in the rear. Mooney defends his conduct upon the ground that Rule No. 2, printed upon the backs of time cards, states that conductors will have charge of trains, etc., and that, no conference having been requested by the conductor, it was his duty to obey him. The Board has made careful examination of the Cowell coupler which gave way, first at Dunkirk then at Hamburg. The Board deems that such couplers are in the highest degree dangerous, and should not be used." We have not yet received a copy of the report, and therefore shall attempt no discussion of it this week.

The question of automatic brakes is up in the colony of South Australia. Trials and a report are to be made for the Colonial parliament. It is understood that the tests will be undertaken especially to determine the best brake for freight trains, and that the competing brakes will be, as they were last year in India, the Westinghouse and the automatic vacuum, both fitted with special quick-acting devices. The automatic vacuum is the brake most largely used in England on passenger trains, but it has not yet been used in regular service with the quick-acting device. Mr. D. H. Neale has been asked to be one of the committee to make the tests and report. His eminent fitness for the work is well known to the readers of the *Railroad Gazette*, and it is to be hoped that he will undertake it. Other members of the committee will probably be Mr. Allison Smith, Locomotive Superintendent Victorian Government Railways; Mr. Roberts, Locomotive Superintendent South Australian Railways; Mr. McCoun, Manager Glenelg Railway, and Mr. Grayson, Member of the South Australian Legislature.

The Ohio House has passed a bill providing that minority stockholders of consolidated railroad companies, may go into court to have the actual value of their stock determined. The occasion for the action is the proposed consolidation of the various pan-handle lines into one corporation. We do not know much about the facts in the present case, but there have been cases in the past when such a law would have been a good one. Suppose a man owns the whole of one line, and a majority interest in another; if the two are consolidated in such a way as to give the first a million too much interest in the new property and the second a million dollars too little, he gains a whole million at one end and loses only part of a million at the other, the remainder of the loss being borne by the minority stockholders of the second road, who have nothing to gain and no voice in the matter. But, to make a law of this kind effective, it should apply to leases as well as to actual consolidations. About as much harm can be done in the former way as in the latter, and the minority interests have at present even fewer judicial safeguards.

A Chicago lumber dealer has hit on a plan of his own for evening up demurrage injustice. He pays his car service bills, but he keeps after the railroads with sharp sticks, and every time he has ground for bringing a claim for delay, overcharge or anything else he does not hesitate to do it. Things that he had been in the habit of overlooking are now religiously attended to, and he feels confident of causing the roads to pay enough on claims to even up the amounts paid for demurrage since such charges were first exacted.—*Northwestern Lumberman*.

This man's practice is better than his logic. He seems to aim to do an injustice for the purpose of balancing a wrong done by another, and so takes credit for being a very wicked sort of fellow; but, after all, he is only doing just what ought to have been done all along. And the railroads, in charging demurrage, are not perpetrating an injustice which must be "evened up," but are trying to right a wrong which has needed "evening up" for many years.

The United States Circuit Court at Little Rock, Ark., has decided that the Arkansas law, which requires a railroad agent to accept compensation, as named in a bill of lading, without question, does not prohibit his reweighing the goods and charging for actual weight, where he may suspect that the waybill is incorrect. The Court decides that the law was not intended to give validity to stipulations in bills of lading which are the result of fraud or mistake. Weighing is a purely mechanical process, and either party may demand verification of weight at any part of the journey.

NEW PUBLICATIONS.

Annual Report and Statements of the Chief of the Bureau of Statistics on the Foreign Commerce and Navigation, Immigration and Tonnage of the United States for the Fiscal Year ending June 30, 1889. 8vo, pp. XCII. and 1,002. Washington, 1890.

The value of our imports and exports for the last three years and the balance of trade have been as below:

Year	Value of Imports	Value of Exports	Balance of Trade
1887	\$692,319,768	\$716,183,211	\$23,863,443
1888	723,957,114	695,954,507	28,002,607
1889	745,131,652	742,401,375	2,730,277

The balance of trade had been in our favor from 1875 to 1888. The values of our trade imports have increased from \$53,62 million dollars in 1880 to 745.13 million dollars in

1889, and our exports of domestic merchandise from 316.24 million in 1880 to 730.28 million dollars in 1889. During this time the products of agriculture have increased from 265.5 million to 532.1 million, or about 100 per cent.; the products of manufacture from 45.7 to 138.7 million dollars, or 303.5 per cent., and miscellaneous products from 14.0 to 59.5 million dollars, or 325 per cent.

A table, giving exports of wheat from various countries from 1880 to 1888 shows that Russia in Europe increased her exports during the nine years from 36.6 million bushels to 126.1 million; British India from 13.9 to 32.9 million; Australasia running about constant from 13.1 to 13.9 million, while the Argentine Republic responds to the heavy investments lately made in railroads and shipping facilities at Buenos Ayres by increasing her shipments from 42,829 bushels in 1880 to 8,721,751 bushels in 1888. We, on the contrary, have decreased our shipments from 144.5 million to 49.5 million bushels, or our proportion of exports has fallen from 69.13 to 19.90 per cent. The above figures do not include flour, and as we are the only people exporting a large percentage of our wheat in flour, the figures would be modified somewhat by including it.

During the past 30 years a considerable change in the character of imports has occurred. In 1880 the value of manufactured articles imported was 261.3 million dollars, and of crude articles 92.4 millions, or 73.88 per cent. was manufactured; in 1889, while the value of manufactured articles had increased to 428.3 million, the value of crude articles had increased to 316.8 million dollars, so that only 57.48 per cent. of our imports were classified as manufactured.

The decline in the proportion of our foreign commerce carried in National vessels, which had run down from 75 per cent. in 1850 to 13.44 per cent. in 1888, has apparently received a slight check, as 13.7 per cent. of our commerce was carried under the American flag last year.

The distribution of our imports and exports to various countries in 1889 is given in percentages below:

	Percentage of imports.	Percentage of exports.
United Kingdom.....	23.93	32.03
Germany.....	10.97	9.12
France.....	9.34	6.18
Italy.....	2.41	1.72
All Europe.....	54.14	78.38
West Indies.....	10.46	4.10
British North America.....	5.77	5.45
Mexico.....	2.86	1.49
Total North America.....	20.25	11.71
Brazil.....	8.12	1.27
Venezuela.....	1.30	.51
Argentine Republic.....	.73	1.15
Total South America.....	12.36	4.61
Australia.....	.80	1.67
China.....	2.29	.38
Japan.....	2.24	.63
Total Asia and Oceania.....	12.50	4.73
Africa.....	.48	.47

Full returns are not made to the Bureau of Statistics of exports by railroad to either Mexico or Canada, the law only providing means for collecting statistics of exports in vessels.

Journal of the New England Water Works Association.—The issue for March of this journal is devoted almost entirely to a paper by Mr. John R. Freeman on Experiments and Practical Tables Relating to Fire Streams. This is the same material, somewhat modified in form, which has recently been published in the *Transactions* of the American Society of Civil Engineers, under the same title. It is a very elaborate and valuable investigation, containing a large number of tables and diagrams giving hydrant pressure, discharge, height and distance of jet for various nozzles, together with much other data deduced from Mr. Freeman's experiments.

The 1889-90 Annual Catalogue of the Massachusetts Institute of Technology contains an increased amount of information relative to that institution. One of the new features is a schedule of topics which includes the larger part of all the subjects of study taught at the Institute. This schedule is made in tabular form, each line of which is numbered for convenience of reference to different parts of the catalogue, where can be found further information on the subjects as classified. The table gives the name of the subject and the manner in which it is taught, whether by lectures, recitations, laboratory work, or in the drawing room or field, and the preparatory subjects required by any one desiring to be admitted to a study of the topic in question. It is a most admirable arrangement and classification of the methods and details of instruction. Owing to the expansion of this institution, this catalogue contains much that will be new and interesting to the alumni.

TRADE CATALOGUES.

Illustrated Catalogue and Price List of the Thompson Manufacturing Co., Cleveland, Ohio.—The product of this company includes corrugated iron for roofs, siding and ceiling; crimped sheet iron for roofs; beaded sheet-iron for siding and ceiling; "double cap" (or pressed standing seam) roofing, one face of steel; "roll cap" roofing of iron or steel; galvanized gutters; corrugated galvanized conductors, and a line of special shapes for finishing ridges and corners, with all necessary fixtures. The

illustrations show the roofing applied to wood or iron rafters, purlins or sheathing, and as used for fireproof floors. The price lists are full and give prices, weights per square foot and per 100 sq. ft., and shipping weights. Much information is given as to methods of shipping and laying, gauges to be used for various purposes, etc. The pamphlet contains cuts of several elevators and mills, covered by this firm with various material. One is the Erie elevator at Buffalo, covered with 75,000 sq. ft. of corrugated siding, 22,000 sq. ft. of tin siding and 25,000 sq. ft. of tin roofing, besides iron cornice, casings, etc. Another is of an elevator in Duluth, covered with 83,600 sq. ft. of corrugated siding. An introduction states that this house was started 19 years ago with two machines and a capacity for 20 squares a day. The present capacity is 1,750 squares a day. Meantime the average output per man employed has increased five times, which indicates the immense reduction in the cost of manufacture of this kind of material.

Puster Bros., dealers in shafting, hangers and belting, at 56 South Canal street, Chicago, have issued a new catalogue and price-list, in which considerable space is devoted to a description and rating of wood split pulleys.

—*The Tanite Co. Catalogue of Emery Wheels, Grinding Machinery, etc.*—This is a handsome catalogue issued by the Tanite Co., Stroudsburg, Pa. It contains illustrations, descriptions and price lists of a number of wheels and grinders and a good deal of interesting information as to their uses. Our readers are already more or less familiar with the direct and forcible style in which Mr. Paret puts forth this kind of information, and which makes his catalogues and circulars good reading whether one wants to buy a Tanite wheel or not.

A Profitable Investment.—Under this title Mr. H. A. Rogers, 19 John street, New York City, publishes a little pamphlet, giving illustrations, descriptions and prices of a large variety of Tanite emery wheels.

TECHNICAL.

Locomotive Building.

The Cooke Locomotive Works, of Paterson, N. J., have an order from the Illinois Central for 20 ten-wheel engines with 19 x 24 cylinders, and weighing 60 tons. The Brooks Locomotive Works, Dunkirk, N. Y., have an order for 15 six-wheel locomotives for the same company. They are to have 18 x 24 in. cylinders and will weigh 42 tons.

The Savannah, Americus & Montgomery will receive four passenger engines next week from the Baldwin Locomotive Works. The Rhode Island Locomotive Works are building four 54-ton mogul freight engines for the road, which are to be delivered by May 1.

The Cleveland, Cincinnati, Chicago & St. Louis is to replace a number of the light engines now in service with heavier ones and will soon let a contract for building them.

The Schenectady Locomotive Works have delivered three passenger engines to the New York Central & Hudson River road the past two weeks, part of the order placed with them a few months ago. The same firm has just completed an engine for the Esquimaux & Nanaimo road in British Columbia.

The Cincinnati, Wabash & Michigan has ordered two new freight engines from the Brooks Locomotive Works, of Dunkirk, N. Y.

The Boston & Maine has placed an order with the Manchester Locomotive Works for 20 new locomotives, including passenger, freight and shifting engines.

The Fitchburg road has recently added 12 new locomotives to its equipment.

The Baldwin Locomotive Works have received a new order to build ten 10-wheel locomotives for the New York, Pennsylvania & Ohio similar to those recently built for the New York, Lake Erie & Western. A 40-ton locomotive has just been completed by the firm for the Satsop road, in Washington.

The Green Bay, Winona & St. Paul has received 15 freight engines within the past few weeks.

The Philadelphia & Reading is receiving the hard coal burning engines ordered of the Baldwin Locomotive Works early in the year. The order includes 15 ten-wheel fast freight engines, 15 consolidation, 10 standard shifting and 10 passenger locomotives. The latter are of the same pattern as those used on the New York and Atlantic City divisions.

The Chesapeake & Ohio has 19 locomotives under contract to be delivered next month.

Car Notes.

The Columbus, Hocking Valley & Toledo has awarded a contract for building 1,500 coal cars to the Indianapolis Car & Manufacturing Co.

The East Tennessee, Virginia & Georgia has divided the contract for building 1,500 freight cars among the following companies: To the Southern Car Co., Knoxville, Tenn., 500; to the United States Rolling Stock Co., 800, and to the Florida Car Works, Green Cove Springs, Fla., 200. As already noted, these cars are to be equipped with air brakes and M. C. B. couplers.

Thirty platform cars, ten box cars and two caboose cars are to be built for the Seattle & Northern at the shops of the Oregon Improvement Co., in Seattle, Wash.

The Chesapeake & Ohio has placed an order with the Missouri Car Co., of St. Louis, for 1,000 box cars equipped with air brakes, to be delivered in May and June.

The Board of Trade of Winona, Minn., invites the attention of manufacturers to a plant, now for sale in that city, consisting of 27 acres, with several large brick buildings equipped with improved wood working machinery. It recommends it as a location for car works, as the city has a population of 23,000, five railroads and Mississippi River navigation.

The Philadelphia & Reading expects to receive 200 gondola cars from the Pullman Car Co. next week. This is part of the order placed with the company several months ago, which included 50 passenger cars, 3,000 twin

hopper gondola cars, and 1,000 other gondolas and six baggage cars. The freight cars are of 30 tons capacity. The baggage cars are extra long, with broad doors, adapted to carrying the scenery of theatre companies. The passenger cars are similar in design to those used on the Atlantic City line last summer, which were also built by the Pullman Co.

The Savannah, Americus & Montgomery has placed an order with the Ohio Falls Car Co., of Jeffersonville, Ind., for 100 platform cars and 100 ventilated fruit cars, which are to be delivered by May 1. The United States Rolling Stock Co. has been awarded a contract to build 300 platform cars for immediate delivery. In addition to these orders 200 platform cars have been leased from the Southern Iron Car Co. Six passenger cars were recently received from the Ohio Falls Car Co., and others are being built by that firm.

The Pullman Car Co. is building at its Detroit shops three cars for the Toledo, Columbus & Cincinnati. Two will be passenger cars and one a combination baggage and passenger car.

The Cincinnati, Wabash & Michigan has recently received two new 34-ft. drawing room cars from the Jackson & Sharpe Co., of Wilmington, Del.

Forty passenger cars are being built by the Pullman Car Co. for the Illinois Central. Twenty of the cars are to be used in suburban service and the others on through trains.

The Wabash has placed an order with the Pullman Palace Car Co. for 36 vestibuled sleeping and chair cars, to be delivered in June and July.

The Ohio Falls Car Co. is building six passenger cars for the Cleveland, Lorain & Wheeling.

Bridge Notes.

The Big Stone Gap Improvement Co., of Big Stone Gap, Va., will construct an iron bridge on its property.

An iron bridge is to be erected at Monilton, Ark.

The drawbridge of the New Orleans & Northwestern, across the Tensas River, near Sicily Island, was completed last week.

The Seattle & Northern has closed a contract with the San Francisco Bridge Co. for the trestling and bridging on the line up the Skagit Valley from Anacortes, Wash.

A contract has also been signed with Tatum & Bowen, of Portland, for a drawbridge over the Swinomish slough.

J. P. Austin, of Sherman, Tex., will receive bids until April 15, for the construction of one iron and five combination bridges in Grayson County.

The plans for the Tenth Street viaduct at Omaha, Neb., have been finally approved by the Board of Public Works, and as the Mayor has signed the ordinance authorizing the construction of the viaduct. It is understood work will be commenced at once.

The Jeffersonville, Madisonville & Indianapolis has just completed an iron bridge 400 ft. long over the White river, near Rockford, Ind.

The county commissioners of Pulaski County, Ga., are considering the plans for changing to a draw the county bridge across the Ocmulgee river at Hawkinsville, Ga. It is expected that the bridge can be raised several feet. If this plan is adopted it will not be necessary to put in the draw. The King Iron Bridge & Manufacturing Co. has submitted plans and estimates for the work. The East Tennessee, Virginia & Georgia is also arranging to put in draws in its two bridges across the same river.

The City Engineer of Johnstown, Pa., has been ordered to prepare plans for a new iron bridge across the Conemaugh River to connect the 14th and 16th wards of the city. The bridge will probably cost \$15,000.

The county commissioners of Cecil County, Md., have contracted with L. O. Cameron to furnish plans and specifications for a new iron bridge over Principil Creek. The contract for building the bridge will be let soon after the surveys have been made.

The Troy & Breaker Island Bridge Co. has been organized by William Kent, Edward F. Murray, of Troy, N. Y., and Erastus Corning, of Albany, N. Y., to build a bridge from a point near the works of the Troy Steel & Iron Co. to Breaker Island and thence to the mainland. The bridge is to be 30 ft. high, with a draw of 200 ft. The capital stock is \$200,000.

Walter B. Brooks, James Sloan, Jr., John B. MacDonald and others, of Baltimore, are interested in a company which proposes to erect bridge works near Baltimore. Two sites have been examined, one at Canton, on the site of the old Bolton Bridge Works, and the other at Curtis Bay.

Shailer & Schnigla have been awarded the contract for constructing three double track steel girder bridges on the St. Paul & Northern Pacific division of the Northern Pacific.

The contract to erect three bridges across the San Antonio river, near San Antonio, Tex., has lately been let to the Berlin Bridge Co.

The Omaha belt line will soon build an overhead iron bridge across Sherman avenue, near the fair grounds, to replace the present wooden structure.

The Board of Supervisors of Rockbridge County, Va., will soon let the contract for constructing iron bridges at Goshen Bridge and Riverside.

The Bridge Commissioners invite proposals until April 7, for the construction of an iron bridge over the Saline River at Benton, Ark.

The Commissioners of Morgan County will erect a bridge over the Muskingum River, at Stockport, O., at a cost of about \$10,000.

The City Council, of Cheyenne, Wyo., opened bids for the construction of the proposed viaduct across the Union Pacific tracks to connect the north and south sides of the city. The only bids received were from the King Bridge Co. for \$85,000 and from M. P. Keefe, of Cheyenne, for \$64,000. No formal award of the contract was made.

C. Eakle, of New Hope, Va., will shortly let the contract for the construction of an iron bridge across Middle River, near Mount Meridian.

It is stated that the Texas & Pacific will build a bridge over the Rio Grande River, at El Paso, Tex.

The Elk River Bridge Co. has been incorporated to build a bridge across the Elk River, near Sutton, Va.

A resolution has been offered in the City Council of Baltimore appropriating \$250 for the City Commissioner to have plans and estimates prepared for a bridge on Monroe street over the Baltimore & Ohio, Baltimore & Potomac and Western Maryland roads.

The County Court of Marion County, Or., has appropriated \$10,000 for rebuilding the big bridge across the Willamette at Salem, and \$6,000 for a new bridge across the Santiam river at Jefferson. Polk County is to appropriate \$10,000 for the former bridge, and its total cost is not to exceed \$40,000. The contract for the structure will be let in August.

The City Council of Cleveland has passed an ordinance granting the cable company the right to build a bridge in Wade Park.

The contract for building the Olden Avenue bridge over the railroad and canal at Trenton, N. J., has been awarded to the New Jersey Steel & Iron Co., of Trenton, for \$16,892.

Bridges are to be built across South Fork River and Beaver Creek, near Abington, Va.

A bridge will be built across Straight Creek, near Pineville, Ky.

Manufacturing and Business.

The Archer gas-fuel process has just been put in operation in the Union Mills of the Illinois Steel Co., Chicago, and also in the Peucoyd Steel Works, near Philadelphia.

The Standard Equipment Co. has been organized at Bridgeport, Conn., for the purpose of buying, selling and leasing railroad equipments.

The Detroit Steel & Spring Co., of Detroit, Mich., last week executed a chattel mortgage on its property for \$83,000 to secure the discounted paper of the company. Over-stock of raw material is said to have made the action necessary.

The Chicago & Northwestern has recently placed an order with the Mills Railroad Gate Co., of Chicago, for 60 gates to be erected at crossings.

The Stark Mfg. Co., of St. Louis, have received orders for nut-locks for nearly 1,000 cars within the past two months. The company has furnished machines for making the nuts and bolts for many of the car building companies. Among those thus supplied are the Lacomia Car Co., the Ensign Mfg. Co., the Missouri Car & Foundry Co., the Pullman Car Co., the Deatur shops of the United States Rolling Stock Co., and the Wichita shops of the Burton Stock Car Co. These companies cut the nuts and bolts and order the keys from the firm.

J. B. Scott & Co., of Pittsburgh, report that they have furnished their plate roofing for the Union station, Chicago, Central Union Station, Cincinnati, and for the new Government pension building at Washington.

The Laidlaw & Dunn Co., of Cincinnati, has found it necessary to enlarge its premises, by adding the building No. 186 West Second street, and uniting it with the Pearl street buildings by tearing down the intervening walls. The building adds 13,000 sq. ft. of floor space, giving the firm 45,000 sq. ft. of floor space for its manufacturing, warehouse and office purposes, in addition to large pipe yards on Third street. The buildings on Pearl and Plum streets will be devoted to manufacturing, and that on Second street will be used for offices.

Ryan & McDonald, of Waterloo, N. Y., manufacturers of steam-shovel cars, derrick fixtures and hoisting engines, have been incorporated as the Ryan-McDonald Manufacturing Co.

Wm. Harris & Son, of Pittsburgh, have added an 800-lb. steam hammer, made by Bement & Miles, to their new shop, the capacity of which has been increased so that now they will be able to turn out machine forgings, sheet metal, cutting dies and punches, etc., much more rapidly than formerly.

The L. W. Pond Machine Co., of Worcester, Mass., is building two large 44 in. planers for a machine shop in Milwaukee, Wis., four for Chicago, Ill., and one for Athens, Ga.

Robert Wetherill & Co., Chester, Pa., have received an order to build a horizontal Corliss engine of 3,500 H. P. for the steel works of Carnegie, Phipps & Co., at Homestead, Pa. The cylinder will be 54 by 72 in., and will weigh 40,000 lbs. The fly-wheel will be made in ten segments and will weigh 200,000 lbs. The crank-pin will weigh 17,000 lbs. The shaft will weigh 40,000 lbs. The casting will be of iron. The total weight of the engine will be over 500,000 lbs.

The Berry Signal Lock & Target Co., of Chester, S. C., has been incorporated with a capital stock of \$15,000 to manufacture lock signals, targets and other railroad signals. The incorporators are J. D. Berry, L. B. Nichols, J. K. Henry and others.

The Pond Machine Tool Co. are about to build an extension adding 20,000 square feet of floor space to their shops at Plainfield, N. J.

The Dunham Manufacturing Co. will remove on April 1 to new and larger offices at Rooms 703 to 707 Phenix Building, Chicago, which will occupy with the National Hollow Brake Beam Co.

Lockwood, Greene & Co. have established an office for architectural and engineering work at 131 Devonshire street, Boston, Mass. Mr. Stephen Greene devotes his personal attention to the management of the business. They make a specialty of plans, specifications and superintendence of all classes of mill construction, and furnish a long list of references.

Iron and Steel.

The Allegheny Bessemer Steel Co., at Duquesne, Pa., has commenced repairing and making additional and extensive improvements to its works. A new cupola will be erected for melting iron to be converted. This will make altogether five in operation. A new iron hoist will also be built and the converters will be repaired and relined.

Carnegie Bros. & Co. are building a 200-ft. iron and brick addition to their rail mill at Bessemer, Pa., in which will be placed some additional straightening presses so that rails may be more expeditiously handled.

John B. Larkin, of Pittsburgh, and others, propose to erect an iron mill at or near West Newton, Pa., to make sheet iron. The company will have a capital stock of \$150,000. James M. Bailey of the firm of Singer, Nimick & Co., proposes to erect another mill near Pittsburgh to produce merchant iron.

Seaman, Sleeth & Black, of the Phoenix Roll Works, of Pittsburgh, are making two very large sets of rolls. One pair is 25 ft. by 14 in. on the face, and with the couplings, 28 ft. long. The other pair is 36 by 152 in. on the face, with a total length of 18 ft. When cast each roll weighed 32 tons. The latter rolls are for a firm who manufacture linoleum, and will enable them to turn out sheets 12½ ft. wide. The widest heretofore made has been 8 ft.

The National Tube Works Co. has, in addition to the new puddling department just placed in operation completed two more large welding furnaces.

Carnegie, Phipps & Co. are erecting eight of the M. V. Smith double-breasted gas producers at their Beaver Falls works.

The Edgar Thomson Steel Works, of Carnegie Bros. & Co., Limited, at Braddock, Pa., have broken all previous records. On March 21, between 6 o'clock in the morning and 6 o'clock in the evening there were turned out 2,507 rails. The No. 2 turn, working eight hours, from 2 to 10 o'clock on the same day, made 1,730 rails, and No. 3 turn from 3 to 6 o'clock Saturday morning, made 1,746 rails, or 6,073 in the entire 24 hours.

The Rail Market.

Steel Rails.—Numerous inquiries are reported by both the eastern and western mills, but excepting the Pittsburgh mill none have taken large orders. The Pennsylvania is said to have divided an order for 15,000 tons among two Pittsburgh mills. There is considerable latitude in the quotations as given by the mills. Those most often given are: New York, \$34@34.50; Pittsburgh, \$33@34, and Chicago, \$35@36.

Old Rails.—There is little demand for old rails, and no sales have been made except at Chicago, where 500 tons of iron rails were sold at \$23.50. Nominal quotations at New York are \$24.50@25 for iron rails and \$21@21.50 for old steel rails, and at Pittsburgh, \$25.50@26 for iron rails.

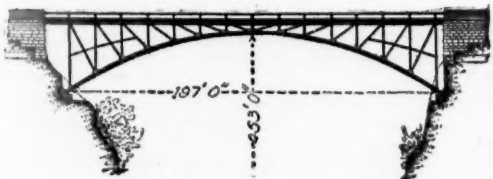
Fire Engines on the Erie.

The "New" York, Lake Erie & Western has equipped a number of switching engines with pumps for fire service, on a plan similar to that shown in the *Railroad Gazette* of July 19, 1889.

Highway Bridge at St. Giustina, Tyrol.

This is an iron arch of a clear span of 196.9 ft., a spring of 32.8 ft., and a clear height above the bottom of the ravine which it crosses of 452.8 ft. Owing to the great height it was necessary to erect the bridge without falsework of any kind, and though there is nothing particularly novel to Americans in this, the proceeding was quite interesting to the Austrian engineers, as it was the first time that a bridge had been so erected in Austria.

The metallic superstructure rests on two arched trusses 14 ft. apart. The panels are about the same length. At the centre the arches proper have a depth of 16 in., the verticals at the same point being 6.23 ft. long. The bridge is a riveted structure, and is constructed, even to the verticals and diagonals, principally of angle iron of various sizes. The roadway is laid upon stringers, supported by transverse trusses, 14 ft. from centre



to centre, and 25 inches deep, uniting the two arched trusses. The roadway proper is composed of a double plank, 4 in. thick and 2 in. thick, respectively, and resting directly on the stringers before mentioned. The ends of the trusses are hinged and rest upon cast-steel shoes, let into the rock. Wedges are provided for adjustment. The total weight of the structure is 210,012 lbs.

The structure was built out from the two abutments simultaneously by traveling cranes. A cable carrying a cage was stretched across the ravine and aided materially in the work, which was completed June 24, 1888. For these particulars we are indebted to *Les Annales des Travaux Publics*.

Improved Blind Slat Planing Machine.

The Egan Company of Cincinnati have just brought out a new four-sided blind slat planing machine for planing all kinds of blind slats on all four sides at one operation. It is new in design and construction and is thus described: It will not tear out or chip on cross-grained stuff, but makes a perfectly smooth slat, free from any wave or breaking out of edges. The side cutters can be run as long as the plain bits without sharpening, which has not heretofore been accomplished on any other machine. The frame is cast in one piece, allowing for long belts for each cutter head, and making a very solid and durable frame, capable of standing any amount of strain. The spindles are large and of the best cast steel, and run in self-oiling boxes, lined with babbit. The upper and lower heads are of cast steel and slotted on all four sides. The side heads are made of gun-metal and carry three knives each. The side heads are placed in the machine in such a manner as to prevent undue wear on the knives when cutting the slat, which is a point well worth considering, as this advantage is not to be found on any other blind slat planer. The machine can also be used for all kinds of light moldings, window stops, weather strips, and work of that class, making it a very desirable machine for all kinds of mill and general work. It has two changes of feed, and is furnished complete with a full set of bits for each head.

Iron and Wooden Sleepers in Germany.

The United States Consul at Dusseldorf reports that the appropriation from the state for the past year was \$2,250,000 for wooden sleepers and only \$1,000,000 for iron sleepers. It is estimated that the yearly import of wooden sleepers will amount in value to \$450,000. A resolution was passed deciding to make application to the Railway Minister, with a view to the more general use of iron beams. Mr. Lueg, General Director, said that the situation of the iron industry at present was not good, and that while the mills had yet much to do for inland works, the export trade has fallen off to an alarming extent. Director Schlink, of Mulheim, gave some points in regard to the weight of metal cross-ties in use on German railroads; that such cross-ties were much too light, the general weight at present being 88.16 lbs., while they should be at least 132.24 lbs. Mr. Vahlkampf gives the following statistics in relation to the cost of iron and wooden sleepers: Iron sleepers—Berg Mark Railway, sleepers, 119½ lbs., 8 ft., 2½ in. long, \$1.60; small iron castings, 5.20 lbs., 17 cents; total cost, \$1.77, from which the value of old material, 68 cents, should be deducted; net cost, \$1.09. Rhenish Railway, cross-ties, 8 ft., 2½ in. long, \$1.56; small castings, \$1.88; total, \$1.74; deduct value of old material, 68 cents; net cost \$1.06. Wooden ties or sleepers—Oak ties, \$1.05; support plates, 10 cents; nails, 13 cents; total, \$1.27; deduct value of old material, 12 cents; net cost, 115.

A New Live Stock Car.

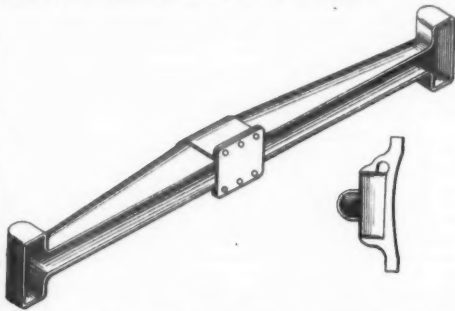
The American Live Stock Company, of Kansas City, has had a car built for its own use which it believes will prove more comfortable and safer in transporting cattle than any yet manufactured. The first car has just been turned out of the shop. It is wider than the ordinary stock car. At either end of the car at the top is an air funnel, which is intended to conduct fresh air to the centre of the car for the benefit of cattle hemmed in by those nearer the ends. The interior of the car is perfectly smooth, all appliances for operating the water troughs and feeding racks being attached to the outside, thus preventing injury to cattle by these projections, which it has been found difficult to overcome. The Live Stock Association will call its car service the "Columbia Buffet Stock Car Company."

A New Ventilator Car.

The Pennsylvania has constructed a new ventilator car for the transportation of bananas and other perishable fruit. The car has small windows with slat shutters in the front, rear and sides. On the inside of the windows are iron slides to slide over the windows should the draught caused by the moving train be more than is required. Inside the car, movable open-work shelves are placed so that twice as many bunches of bananas can be packed in the car as in the ordinary freight cars. The doors are provided with ventilators made of iron lattice-work that can be closed from the inside in the same manner as the other ventilators. The company will have a number of these cars running by June.

Pressed Steel Brake Beam.

The brake beam shown herewith is one invented by Mr. Sampson Fox, of Leeds, England, the inventor of the system of manufacturing pressed steel used by the Fox Solid Pressed Steel Company in this country. This invention relates to brake beams of pressed steel of peculiar configuration and adapted for the reception of the brake shoes at its ends. It is made in the shape

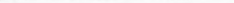


shown, with an attachment in the middle for the brake lever. The claims of the patent on this beam are as follows:

1. A brake beam formed of pressed steel having pressed therein the hollow T-shaped heads all formed from one plate of steel in the process of pressing, substantially as described.
2. An improved brake beam for rolling stock, of pressed steel, with terminal heads as a new article of manufacture.

A French Lock Spike.

A Frenchman has got up a lock spike which is shown in the cut, and which hardly calls for any description. A hole is bored in the tie to the depth where it is desired that the anchorage shall be. A piece of cast iron square at the lower end and provided with grooves on its lateral faces, the curves of which are more or less pronounced according to the amount of spread to be given to the points of the spike, is dropped in the hole. When the spike is driven home its two points are spread by the curved surfaces of the block and turn up in the manner shown. We are not told that this spike has been put into use on any of the French railroads.



Boiler Explosion.

The boiler of engine No. 73 of the Fitchburg Railroad burst while standing in the yard at East Fitchburg, March 24. The fireman and a brakeman were injured, but not seriously. The cause is authoritatively stated to have been a badly corroded plate.

The Botsford Car-Heating Co.

This company has secured an order from the Cleveland, Lorain & Wheeling for fitting of its entire passenger equipment with the Botsford system of steam heating from the locomotive, using the patented "cork lined hose." One train has already been equipped, and is in service, giving good satisfaction. The new passenger coaches now being built by the Ohio Falls Car Co. for the road are also being fitted with the Botsford apparatus.

Compound Locomotives.

Mr. F. W. Dean has nearly completed the designs for a compound locomotive for the Old Colony Railroad, to work the Boston & New York Shore Line expresses between Boston and Providence. Mr. Lauder has designed the boiler, which will be 50 in. in diameter, with extra strong butt joints. The steam pressure will be 200 lbs. per square inch. The cylinders are 20 in. and 28 in. by 24 in., the high-pressure cylinder being steam jacketed. The driving and truck wheels are 69 in. and 36 in. in diameter, respectively. The construction is being rapidly pushed at the South Boston shops.

A New Air Brake.

The Eames Vacuum Brake Co., has issued a circular giving notice that it has perfected an improved compressed air brake for passenger and freight cars, and is now prepared to demonstrate its superior merits over any other brake. It is quick-acting, automatic and interchangeable with the Westinghouse, and it is claimed that the locomotive equipment is decidedly superior to any other brake in the market.

THE SCRAP HEAP.

Speed of Trains in Chicago.

Chicago dispatches indicate that the Mayor has not yet approved the new ordinance relative to fencing railroad premises and allowing increased speed of trains, and that various details are still under discussion. A communication has been received by the city government from E. P. Ripley, of the Chicago, Burlington & Quincy Railroad in reference to viaducts. He proposes in behalf of his company to build viaducts over every third street along the right of way of the road from Stewart to Western avenues (those already erected being taken into account) on the following conditions: (1) That the company be given an unlimited right of speed; (2) that the streets between those viaducts be vacated or inclosed; (3) that the railroad company be given permission to put in subways instead of viaducts, if that policy is expedient. The newspaper report says: "By building viaducts Mr. Ripley does not mean the company shall pay land damages or construct the approaches. It will be responsible only for superstructures and abutments. The company also proposes to build only two viaducts each year, and in cases where the tracks are paralleled by those of other companies to build only half of the superstructure, half the centre pier and abutment. The letter was referred to the Railroad Committee."

A Car Lamp Explosion.

The death of the Hon. J. G. Ramsay, of which we were apprised by wire from Adelaide last month, appears to have been surrounded by circumstances of extreme sadness. Mr. Ramsay, it seems, was traveling alone in a carriage on the railway from the north to Adelaide, on Jan. 17, when the kerosene lamp, by which the carriage was lighted, exploded, and the honorable gentleman was so severely injured before he could be rescued, that he died a few hours afterward. The terrible affair caused a widespread feeling of horror throughout the Colony, and, to allay public alarm in regard to railway traveling, the authorities found it necessary to at once forbid any further use of kerosene for lighting purposes in the trains.—*Colonies and India*.

Another Railroad in Asia.

It is announced that the construction is to be shortly begun of a railroad through Anatolia, in Asiatic Turkey. The Deutsche Bank, of Berlin, and an English corporation are conducting the enterprise. The Sultan has allotted the revenues of certain provinces as a guarantee for the payment of the share of the Turkish Government in the outlay. The road from Scutari to Ismid, 58 miles, has been transferred to the Deutsche Bank with the concession for extending it about 300 miles to Angora.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

- Chicago, Rock Island & Pacific, quarterly, 1 per cent., payable May 1.
- Connecticut River, quarterly, 2 per cent., payable April 1.
- Nashville, Chattanooga & St. Louis, quarterly, 1¼ per cent., payable April 10.
- Panama, 3½ per cent., payable March 27.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

- Adirondack, annual, New York City, April 15.
- Allegheny Valley, annual, Pittsburgh, Pa., April 8.
- Ashbourne, Cheltenham & Philadelphia, special, Philadelphia, Pa., April 5.
- Baltimore & Ohio, special, Baltimore, Md., March 31, to vote upon a proposed lease of the West Virginia & Pittsburgh.
- Cattawissa, annual, Philadelphia, Pa., April 1.
- Chicago & Alton, annual, Chicago, Ill., April 7.
- Chicago & Grand Trunk, annual, Chicago, Ill., April 9.
- Chicago, Rock Island & Pacific, annual, Chicago, Ill., June 4.
- Chicago, St. Louis & Pittsburgh, annual, Union Depot, Indianapolis, Ind., April 9.
- Chicago & West Michigan, annual, Muskegon, Mich., April 6.
- Colorado Midland, annual, Colorado Springs, Col., April 7.
- Dallas Terminal, annual, Cockrell Building, 825 Main street, Dallas, Tex., April 5.
- East Tennessee, Virginia & Georgia, special, Knoxville, Tenn., April 15.
- Hocking & Western, special, Pickaway House, Circleville, O., March 30, to vote upon a proposed increase of stock and issue of bonds.
- Joliet & Chicago, annual, Chicago, Ill., April 7.
- New York Central & Hudson River, annual, Grand Central Station, New York City, April 16.
- Temiscouata, special, St. Louis Hotel, Quebec, April 9, to act upon a proposed issue of bonds.
- Texas & Pacific, annual, Dallas, Tex., April 15.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

- The Master Car Builders' Association will hold its next annual convention at Old Point Comfort, Va., June 10. Rooms should be secured of Mr. F. N. Pike, manager, Hygeia Hotel, Fortress Monroe, Va.
- The New England Roadmasters' Association will hold its eighth annual meeting at Boston, Mass., Aug. 20 and 21.
- The New England Railroad Club meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.
- The Western Railway Club holds regular meetings on the third Tuesday in each month, except June, July and August, at its rooms in the Phenix Building, Jackson street, Chicago, at 2 p. m.
- The New York Railroad Club meets at its rooms, 113 Liberty street, New York City, at 7:30 p. m., on the third Thursday in each month.
- The Central Railway Club meets at the Tift House, Buffalo, the fourth Wednesday of January, March, May, August and October.
- The Northwest Railroad Club meets on the first Saturday of each month in the St. Paul Union Station at 7:30 p. m.
- The Northwestern Track and Bridge Association meets on the Saturday following the second Wednesday of each month at 7:30 p. m. in the director's room of the St. Paul Union Station, except in the months of July and August.

The American Society of Civil Engineers holds its regular meeting on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street, New York.

The Boston Society of Civil Engineers holds its regular meetings at Boston, at 7:30 p. m., on the third Wednesday in each month. The next meeting will be held at the American House.

The Western Society of Engineers holds its regular meetings at its hall, No. 67 Washington street, Chicago, at 7:30 p. m., on the first Tuesday in each month.

The Engineers' Club of St. Louis holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The Engineers' Club of Philadelphia holds regular meetings at the house of the Club, 1,122 Girard street, Philadelphia.

The Engineers' Society of Western Pennsylvania holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Penn Building, Pittsburgh, Pa.

The Engineers' Club of Cincinnati holds its regular meetings at 8 p. m. on the third Thursday of each month at the Club rooms, No. 24 West Fourth street, Cincinnati.

The Civil Engineers' Club of Cleveland holds regular meetings on the second Tuesday of each month, at 8:00 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the Fourth Tuesday of the month.

The Engineers' Club of Kansas City meets at Kansas City, Mo., on the first Monday in each month.

The Engineering Association of the Southwest holds regular meetings on the second Thursday evening of each month at 8 o'clock, at the Association headquarters, Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The Civil Engineers' Society of St. Paul meets at St. Paul, Minn., on the first Monday in each month.

The Montana Society of Civil Engineers meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The Civil Engineers' Club of Kansas holds regular meetings on the first Wednesday in each month at Wichita, Kan.

American Association of General Passenger Agents.

The association held its semi-annual convention in the City of Mexico last week. It adjourned to meet in Denver, Sept. 17. The following officers were elected for the ensuing year: President, A. C. Michaelis, of the Mexican Central; Vice-President, E. O. McCormick, of the Cincinnati, Hamilton & Dayton; Secretary, A. J. Smith, of the Lake Shore & Michigan Southern. General Passenger Agent W. R. Busenbark, of the Chicago, St. Paul & Kansas City, is Chairman of the Executive Committee for the ensuing year.

At the close of the meetings a dinner was given to the members by the Mexican Central, Mexican National, Inter-Oceanic and Mexican roads. General Passenger Agent Michaelis, of the Mexican Central, presided. On March 25 a public reception in honor of the passenger agents was given by President Diaz. The members were introduced by Minister Ryan, and Mr. James Charlton, of the Chicago & Alton, made an address, to which President Diaz responded.

American Railway Master Mechanics' Association.

The executive committee has issued a circular announcing that the Lookout Mountain Hotel, at Chattanooga, Tenn., where it had been decided to hold the next annual convention, is not far enough advanced toward completion to justify them in depending upon it to furnish the necessary accommodation for the convention. As the cities of Buffalo and Montreal, the alternative places selected for the convention, are very far from Old Point Comfort, Va., where the Master Car Builders' Convention will meet, and which will be attended by many members, the committee has asked the members to vote on a new place of meeting, and send their votes to the Secretary, Mr. Angus Sinclair, at 39 Grove street, East Orange, N. J.

Boston Society of Civil Engineers.

MARCH 19, 1890.—The annual meeting was held at the American House, Hanover street, Boston, at 10:30 o'clock. President Fitzgerald in the chair. Forty-five members and forty visitors present.

The following persons were elected members of the Society: David A. Harrington, John L. Howard, Clarence A. Perkins, Frank H. Snow.

The Secretary read the annual reports of the government and of the Treasurer. The reports were accepted and ordered printed.

The annual reports of the several special committees were received and their consideration assigned to the next meeting.

The tellers announced the result of the letter ballot for officers as follows:

President, Clemens Herschel; Vice-President (for two years), John R. Freeman; Secretary, S. Everett Tinkham; Treasurer, Henry Manley; Librarian, Frank W. Hodgdon; Director (for two years), Fred K. Brooks.

Mr. Cope Whitehouse, of New York, was then introduced, and addressed the Society on "The Rajah Canal and Irrigation in the Nile Valley." The address was fully illustrated by lantern slides. At the conclusion of the address Mr. Whitehouse very handsomely had thrown on the screen a number of views of the pyramids of Egypt, and explained his theory of their construction.

Engineers' Club of St. Louis—National Organization of Engineers.

At the regular meeting of the St. Louis Club, held March 19, Prof. J. B. Johnson read an address on the Organization of a Federal Council of Engineers. The author, together with Messrs. Searles, of Cleveland, and Knight, of Kansas City, had, at the recent meeting of the Board of Managers of the Association of Engineering Societies, been appointed a committee to prepare an address to the engineers of the country on this subject. The paper was the result of the author's investigations. A short time ago President Towne, of the American Society of Mechanical Engineers, had addressed the leading engineering bodies of the country, suggesting a joint conference. This conference was to be simply provisional, and was not binding upon any of the associations or clubs. Prof. Johnson's address treated of the present status of engineers as compared with the members of other professions, and indicated some of the advantages that might result from a national organization. He gave an abstract of the qualifications required for membership in most of the engineering societies in the country, together with the number of full grade members, showing a total of over 5,000. He thought that there were some features in the organization of the American Medical Association which might serve as a pattern. He men-

tioned, as among the functions of a general organization, the establishment of a uniform grade of qualifications for admission; some attention to the education of engineers, and the class and rank of the degrees given by engineering schools; the proper use of the title "engineer"; some attention to the ethics of the profession; the formation of a general library; the establishment of permanent headquarters for engineers; the joint publication of proceedings and papers, as well as an index of general engineering literature; the awarding of medals for papers of value, and for engineering work of exceptional merit; the advocacy of state control over engineering structures; engineering representation on certain state boards, and in the direction of municipal works; the securing of government aid in making tests of material; the establishing of standards of tests and shapes, and forms for making reports; the appointment of committees to investigate failures of engineering structures, as well as to report upon the success of new methods and structures; the entertainment of distinguished visitors, etc. He believed that an organization of this kind would unify the interests of engineers, and mark a new era in the profession.

In the discussion Mr. Seddon stated that no two members would probably agree as to the details of an organization of this kind. His own view of the situation was that this club was doing well as now situated, and while it should not be too conservative, it would do well to go slow in the matter, holding itself in readiness to take advantage of any general movement that might develop.

Mr. Robert Moore desired to know by what authority the Board of Managers of the Association had appointed this committee. He thought that some of the objections raised to a general organization were still unanswered, and he was not sure that the wider objects aimed at could be attained; or, if attained, would be found of much real value. He saw a decided difference between the profession of engineering and those of medicine and law, where general organizations served specific purposes. He called particular attention to the fact that engineering in these days is not a single profession, but a dozen.

Professor Johnson in reply stated that the present action was not being taken by the committee as representing the sentiment of the engineering bodies of which they were members, but unofficially, simply with a view of mutual conference, with the possibility of developing some plan for future action, which might in due time be submitted for the consideration of the societies.

Mr. McMath gave the result of previous efforts in this direction. He thought that such a council as proposed by Professor Johnson would not be representative, but in time would be made up of aristocrats. He thought that if a general organization were ever reached it must come in one of two ways: First, as a purely representative body; second, by absorption. In his opinion, the latter plan promised the best results. He was not sure that it was desirable that all who called themselves engineers should unite. The interests to be considered were very diverse, and he thought it best to go slow. He was in favor of a thorough discussion of this question, in the hope that something of value might be evolved.

Professor Potter stated that the question was not what might be done, but what could be done, practically, in the near future. He thought that this question was one of development, which in time would work out its own solution. He thought that a combined publication, and the adoption of certain standard units, were matters in which the various engineering associations might work together, and thought that it was not impossible to do effective work in this direction with the present organizations.

Mr. Wheeler called attention to the experience of one of the national bodies where the diversity of interests had led to the division of the society into eight or ten sections, each with its special work. These sections had found more to interest them in their special work than in the general organization, and some of them were withdrawing from the national body, and there was great danger of disintegration. This experience might be worth considering now. He thought that the establishing of standards and the entertainment of visitors were points upon which the societies should co-operate, but in his opinion the formation of one general association would result in such an incongruous mass that its efficiency and stability would be doubtful.

Mr. Beahan considered this question one of growth and education. He saw no danger in the present general tendency towards a national organization. He did not see the necessity of a "trade mark" for engineers, neither did he see that it could do any harm. On the other hand, there was a possibility of considerable good, which might well be attempted.

Prof. Johnson stated that while it was true there were many different branches of engineering, he still thought there were numerous questions of general interest which would furnish work for a national organization. He called attention to the fact that the general public did not, as yet, recognize engineering as a profession.

Dr. Taussig stated that this was in a large measure due to the fact that engineers themselves did not insist on such recognition. In his opinion, this could be overcome by a combined effort of engineers individually.

PERSONAL.

—Mr. William Loughridge, the inventor of the Lough ridge air brake, died in Philadelphia last week.

—Mr. Joseph H. Craig, Auditor of the Louisville, New Albany & Chicago, has resigned to accept the position of Secretary of the Chicago Ship Building Co.

—Mr. W. G. Richards, who has been engaged in car-wheel and locomotive work for some time past, has been appointed Superintendent of the American Car Wheel Co.'s Works, near Boston, Mass.

—Mr. E. C. Jones, General Passenger and Freight Agent of the Valley (Ohio) road, has resigned to accept the position of General Agent of the Union and Pennsylvania lines, with headquarters at Akron, O.

—Mr. John S. Harden, Treasurer of the Western Maryland, died suddenly in Baltimore of heart disease March 24. He was 68 years old, and had been connected with the Western Maryland for 16 years.

—The office of Engineer of Bridges and Buildings has been abolished on the New York, Lake Erie & Western. Mr. C. W. Bucholz, who filled the position, has been appointed Civil Engineer of the company and its leased lines.

—Mr. J. C. Loomis, Superintendent of the Cincinnati division of the Chesapeake & Ohio, has resigned. He was formerly with the Louisville & Nashville as As-

stant Superintendent of the Louisville, Lexington & Cincinnati division until last November, when he resigned to go to the Chesapeake & Ohio.

—Mr. J. F. Bergin, who was private secretary to Col. James M. Donahue before his death, and who is one of the executors of his estate, has been elected President of the San Francisco & North Pacific Railroad and also a director of the company, to succeed him. Mr. Bergin is 34 years old, and became private secretary to Col. Donahue, in May, 1886.

—Mr. William Kent, long well known as a mechanical engineer and writer, and Vice-President American Society of Mechanical Engineers, has opened an office as consulting engineer, Times Building, New York City. He has taken the New York agency of Messrs. Hunt & Clapp's Pittsburgh Testing Laboratory, of which he was one of the original proprietors.

—Mr. Charles H. Mallory, the head of the Mallory Steamship Line, died at his home in Brooklyn, N. Y., March 21, aged 76 years. He had been in failing health for over a year. Mr. Mallory's father was a well-known ship builder, and during the civil war the firm built several ships for the government. The business was later removed to New York, and the present steamship line, which now has ten steamers in service, was established.

—Mr. W. C. McMillan, who has been Secretary of the Michigan Car Co. and the Detroit Car Wheel Co., of Detroit, Mich., has been elected General Manager of both companies, to relieve Mr. Hugh McMillan, who still continues to hold the position of Vice-President of the two companies. Mr. W. C. McMillan has resigned as Secretary of the Michigan Car Co., but still holds that position with the Detroit Car Wheel Co. Mr. Joseph Taylor has succeeded him as Secretary of the former company.

—Mr. C. F. Thomas, Master Mechanic of the Georgia division of the East Tennessee, Virginia & Georgia, has resigned that position to become Master Mechanic of the Central of Georgia, at Macon, Ga., succeeding Mr. D. M. Gugel. Mr. Thomas has been Master Mechanic of the East Tennessee, Virginia & Georgia since December, 1885. He has been connected with the mechanical department of various roads since 1875, serving with the Pennsylvania, Louisville & Nashville, and Chesapeake & Ohio.

—John C. Campbell, formerly chief engineer of the Public Works Department of New York City, died March 26 at his home in New York. He was born at Cherry Valley, Otsego County, N. Y., in 1817, and was the son of Judge James S. Campbell and nephew of Dr. William Campbell, Surveyor-General of this state. He was an engineer of considerable distinction, and had been connected with many important works, notably the Croton Reservoir, the Hudson River Railroad, the Panama Railroad, and several railroads in different parts of the United States. Latterly, he was best known in hydraulic engineering.

—Mr. Edward S. Washburn has been appointed Freight Traffic Manager of the Cleveland, Cincinnati, Chicago & St. Louis. Mr. Washburn has been connected with a mercantile firm in Chicago for the last few years, but previous to this he had been in the railroad service since 1865. He began as a clerk in the office of the Chicago, Burlington & Quincy, and served that road in various capacities, becoming Assistant General Freight Agent. He resigned to go into the employ of the Michigan Central. He was later Traffic Manager of the Troy & Boston, and resigned to engage in business in Chicago.

—Mr. Lucius Tuttle, who succeeded Mr. Samuel F. Pier son as Commissioner of the Passenger Committee of the Trunk Line Association last April, has resigned that position to become General Manager of the New York, New Haven & Hartford. Mr. Tuttle was Passenger Traffic Manager of the Canadian Pacific for over two years before accepting the commission, and was previously Assistant General Passenger Agent of the New York & New England, Assistant to the General Manager of the Eastern and General Passenger Agent of the Boston & Lowell. He is 44 years old.

—Mr. William J. Murphy, General Superintendent of the New York, Lake Erie & Western, has resigned and sailed this week for Europe, accompanied by his wife. He has been in poor health for the last three months. Mr. Murphy has been in the service of this road since 1862. He entered its employ as a messenger in the telegraph office at Susquehanna, Pa., when he was 14 years old. He has since been telegraph operator, station agent, yard master, train dispatcher, Division Superintendent, and General Superintendent since August, 1887, when he succeeded Mr. Benjamin Thomas, resigned.

—Mr. Charles L. Colby, President and Treasurer of the Wisconsin Central, resigned those positions this week. Mr. Colby will devote his attention to the mining interests of the company and will still continue as a director of the Northern Pacific. Mr. Colby has been connected with the Wisconsin Central since its construction and has been President since 1877. He resigned in November, 1888, but at the next annual meeting consented to resume the position temporarily. Mr. Edwin H. Abbot, Vice-President and Secretary of the company, has been elected President and Treasurer to succeed Mr. Colby.

ELECTIONS AND APPOINTMENTS.

Bangor & Piscataquis.—The annual meeting of the stockholders was held in Bangor, Me., recently, and the following directors were elected: L. J. Morse, Charles L. Marston, John Cassidy, N. C. Ayer, E. B. Neally, Charles F. Stetson, Isaac Strickland, B. B. Thatcher and A. M. Robinson. The only change was the election of N. C. Ayer to succeed A. G. Wakefield. The directors elected E. B. Neally, President; H. W. Blood, Treasurer.

Buffalo, Lackawanna & Pacific.—The annual meeting was held recently at No. 24 West Seneca street, Buffalo. The following officers and directors were elected: Joseph Richardson, New York, President; James R. Smith, Buffalo, Vice-President; J. E. McIntire, Buffalo, General Manager; Charles M. Howe, Buffalo, Secretary; C. B. Gaskell, Niagara Falls, Treasurer; Neil McDonald, J. S. Smith, J. D. Ripley, C. J. Pearson, New York; W. E. Dorwin, Owego, and R. F. Goodman, Geo. B. Matthews, and E. H. Butler, Buffalo, directors.

Burksville & Northwestern.—The incorporators of this Kentucky road are Dr. W. Godfrey Hunter, W. F. Alexander and William Barton, of Burksville, Ky.; Hon. Thomas Murray, Metcalf County, and J. M. Fetter and W. C. Nones, Louisville. The following officers have been elected: President, W. F. Alexander, Burksville; Vice-

President, W. C. Nones, Louisville, and Secretary and Treasurer, J. P. Frank, Jr., Burksville.

Cairo & Kanawha.—The directors have elected H. S. Wilson, President; A. Rutherford, Vice-President; Robert Wilson, Secretary and Treasurer; W. N. Miller, Parkersburg, W. Va., Attorney.

Canadian Pacific.—The following appointments have been made: J. W. Leonard, Superintendent of the Atlantic division, with office at Montreal; T. Williams, Assistant Superintendent, Toronto Junction to Windsor, and Guelph, and Ingersoll branches, office at Toronto; R. R. Jamieson, Assistant Superintendent, Toronto to Owen Sound (including Toronto Junction, Parkdale and Queen's Wharf), Teeswater, Orangeville and Elora branches, office at Toronto; R. Cardiff, Assistant Superintendent, Toronto Junction to Montreal Junction and St. Luc Junction, office at Smith's Falls.

Central of Georgia.—Milo S. Freeman, Auditor of the Southern Railway & Steamship Association, has been appointed Auditor of Receipts of this road, with office at Savannah, to succeed Robert E. Mims, resigned.

Chattanooga, Cleveland & Murphy.—The annual meeting of the stockholders of the company was held in Chattanooga, Tenn., recently. E. Watkins, C. A. Lyerly, John A. Hart, C. L. Hardwick, John H. Parker, J. H. Hardwick, J. W. Cooper, Henry E. Colton and J. W. Patton were chosen directors.

Chesapeake & Ohio.—J. C. Loomis, Superintendent of the Cincinnati division, having resigned, to take effect April 1, 1890, H. Frazier has been appointed Superintendent of the Huntington and Cincinnati divisions, with office at Huntington, W. Va. The office of Superintendent of Maintenance of Way has been abolished, and superintendents will assume full charge of this department on their respective divisions, reporting direct to the General Superintendent. W. J. McKee has been appointed Assistant Superintendent of the Cincinnati division, in charge of transportation, with office at Cincinnati. George S. Slipp has been appointed Car Service Agent in addition to his duties as Car Accountant.

Cincinnati & Atlantic.—The incorporators of this Tennessee company are: W. T. Lane, T. McElwee, J. J. Ivins and W. S. Gaston, of McMinn County, Tennessee; J. F. Tarnoter, F. D. Owings and W. E. McElwee, of Roane County, Tenn.; George R. Eager and H. W. McElwee, of New York City, and Henry C. Young, of Boston, Mass.

Cleveland, Akron & Columbus.—The annual meeting of the stockholders of the road was held in Akron, March 20, and the old directors were re-elected as follows: N. Monsarrat and Col. G. T. Perkins, Akron; J. A. Horsey, E. Norton and W. G. Raoul, New York; R. F. Smith and J. M. Adams, Cleveland.

Cleveland, Akron & Western.—The following directors and officers were elected at a meeting of stockholders in Akron, O., March 17. The road is a consolidation of the Pittsburgh, Akron & Western and the Cleveland & Western. Directors: James D. Callery, J. M. Schoonmaker and Josiah N. Davidson, of Pittsburgh; Gen. A. W. Jones, of Youngstown; James M. Semple, of Toledo; Col. A. L. Conger, D. E. Hill and Lewis Miller, of Akron. Officers: President, James D. Callery, of Pittsburgh; Treasurer, Charles D. Milnor, of Pittsburgh; General Manager, William Semple, Jr., Allegheny; General Superintendent, C. W. Risley, and Chief Engineer John H. Semple, of Granville, O.

Cleveland, Cincinnati, Chicago & St. Louis.—Edward S. Washburn has been appointed Freight Traffic Manager, with office in Cincinnati.

Easton, Centerville & Chestertown.—The incorporators of the company are: E. L. F. Hardcastle, George R. Goldsboro and Hedge Thompson, of Talbot County, Md.; W. McKenney, James Brown, John B. Brown, of Queen Anne County, and James A. Pearce and W. S. Walker, of Kent County.

Eureka Springs.—The stockholders met in Eureka Springs, Ark., March 16, and elected the following directors and officers: R. C. Kerens and C. H. Smith, St. Louis; T. W. Taylor, Fort Worth, Tex.; L. H. Roots, Little Rock; Powell Clayton, F. M. Richardson, J. B. Obenshane, A. H. Foote, all of Eureka Springs, and N. Hermann, New York. The officers are: Powell Clayton, President and Manager; Logan H. Roots, Vice-President and Treasurer; A. H. Foote, Secretary.

Fitchburg.—Joseph W. Richards has been appointed Auditor of Freight Accounts, with office in Boston, vice J. D. Giauque, resigned.

Florida, Dawson & Northern.—This company was recently organized in Georgia with the following officers: R. L. Bennett, President; B. H. Hood, Secretary and Treasurer, and F. A. Ruggles, of Dawson, Ga., General Manager.

Florida Midland.—The annual meeting of the stockholders of the company was held in Apopka, Fla., March 13. The following were chosen directors: J. H. Buttrick, Edward Page, Cyrus Carpenter, John Spaulding, C. C. Read, F. S. Mackenzie, John Pearce, F. C. Bill, A. E. Drought, John F. Cogswell and Andrew Johnson.

Frankford Creek.—The company has been incorporated in Pennsylvania by officers of the Pennsylvania; J. N. Du Barry, President; Henry D. Welsh and R. D. Barclay, William H. Barnes, John P. Green, Philadelphia; N. Parker Shortridge, Wynwood, and William A. Patton, Radnor, Pa., are directors.

Georgia Southern & Florida.—F. H. Nelms, late of the Kansas City, Memphis & Birmingham, has been appointed Car Accountant of the road, with headquarters at Macon, Ga.

Georgia, Tennessee & Alabama.—The incorporators of this Georgia road are: Hon. Logan H. Roots, Little Rock, Ark.; W. E. Donaldson, Jasper, Tenn.; J. C. Wall, Wallview, Tenn.; A. J. McBride, F. P. Rice, Atlanta, Ga.; G. W. M. Tatum, Trenton, Ga.; R. L. Spencer, J. M. McBride, Tallapoosa, Ga.; J. B. McCullom, E. Watkins and C. P. Richardson, Chattanooga, Tenn.; W. B. Thomas, Tennille, Ga.; C. F. Hall, Louisville, Ky.

Gulf, Brazos Valley & Pacific.—The charter filed in Texas last week mentions the following as incorporators: E. J. Gurley, W. H. Ross, George B. Gurley, H. D. White, S. W. Slayden, W. W. Seley, A. J. Carothers, all of Waco, and S. M. Taylor, of Weatherford.

Kentucky Central.—The annual meetings of the stockholders of the Kentucky Central and Maysville & Lexington roads were held in Covington, Ky., last week. The following directors were elected: Calvin S. Brice, Henry Thomas, George Bliss, L. E. Gates, Elliott H. Pendleton, Henry Lewis and H. E. Huntington. Henry Lewis was elected to succeed M. E. Ingalls, resigned.

Kentucky Union.—Levi Hege has been appointed General Superintendent, with office at Lexington, Ky., to succeed George D. Wadley, resigned.

Leavenworth & St. Joseph.—These officers have been elected: Raymond Du Puy, St. Paul, President; C. W. Benson, Vice-President; John L. Pratt, Secretary, and Francis Skipwith, Treasurer.

Louisville, New Albany & Chicago.—Edward W. Morris, Road Foreman of Engines on the Jeffersonville, Madison & Indianapolis, has been promoted to be Superintendent of Motive Power of this road and the Louisville Southern.

Mexican National.—The bondholders met at the office of the company, 6 Wall street, New York, this week and nominated eight directors to be voted for by the voting trustee, the Farmers' Loan & Trust Co., at the annual election. The six nominees who live in the United States are William G. Raoul, Josiah G. Horsey, Charles C. Beaman, George Coppel, Lloyd Aspinwall and Eckstein Norton. The nominees who live in Mexico are Emilio Velasco and C. S. Stanhope.

New Orleans & Northwestern.—W. C. Gunn, General Manager, announces the appointment of I. V. B. Kennedy to have charge of the yards, track and rolling stock as Superintendent.

New York, Lake Erie & Western.—W. J. Murphy, General Superintendent, has resigned. No successor has yet been appointed, and the business of the office will be attended to by Second Vice-President E. B. Thomas, 21 Cortland street, New York City.

New York, Schenectady & Ogdensburg.—These directors were elected at a meeting at Coeymans' Junction, N. Y., last week: C. J. Crouse, P. H. Flagler and Joseph Allen, Clarksville; W. A. Wasson, M. D., Greenville; H. B. Whitcomb, Cairo; C. Du Bois and Arthur Van Norman, Palenville; D. W. Jennings, Cairo; Cyrus Hineckley, Indian Fields; Edgar Snyder, Woodstock; H. H. Mead, Clarksville, and Charles R. Knowles, Albany. W. H. Slingerland, Jr., was appointed Chief Engineer.

Norfolk & Carolina.—James F. Maupin has resigned as General Forwarding Agent of the Seaboard Air Line and Atlantic Coast Line, to accept the same position with this road to handle the business of the Richmond & Danville and Atlantic Coast Line.

Norfolk & Western.—J. B. Fuller has been appointed Division Engineer of the Radford Division, with headquarters at Roanoke, vice E. F. Mitchell, transferred.

Northwestern Missouri.—These officers have been elected: President, George E. St. John, Port Clinton; Vice-President and General Manager, C. W. French, Mansfield, Second Vice-President and General Freight Agent, E. H. Zurhorst, Sandusky; Secretary, S. A. Jennings; Treasurer, R. Brinkerhoff; Solicitor, F. M. Wolf.

Okanagan & Kootenai.—The incorporators of the company are Edward G. Prior, Henry S. Mason, and Frank S. Bernard, of Victoria, B. C.; David Oppenheimer and John A. Mara, Vancouver, B. C.

Omaha, Superior & Southwestern.—The officers of this road are F. P. Bonnell, President, Superior, Neb.; Clark A. Smith, Secretary, Cawker City, Kan.

Orange Belt.—The following officers were elected at the annual meeting in Oakland, Fla., March 14: President, E. T. Stolesbury, Philadelphia; Vice-President, T. E. Wilson, Sylvan Lake, Fla.; General Superintendent, Frank F. Bond; Chief Engineer, A. L. Hunt, Jr., Oakland, Fla.; Secretary and Auditor, Joseph W. Taylor, all with office at Oakland.

Orleans, West Baden & French Lick Springs.—At the annual meeting of this company and of the Bedford & Bloomfield in New York recently the following directors were elected: W. Dowd, Elihu Root, James Roosevelt, Joel B. Erhardt and R. G. Rolston, New York; R. R. Hill, Mount Morris, Ill., and John B. Carson, Chicago.

Pennsylvania.—At the annual meeting of the company held in Philadelphia, Pa., March 23, the old board of directors were re-elected as follows: George B. Roberts, Wistar Morris, Alexander M. Fox, Alexander Biddle, N. Parker Shortridge, Henry D. Welsh, William L. Elkins, H. H. Houston, A. J. Cassatt, C. A. Griscom, B. B. Comegys, Amos R. Little and W. H. Barnes.

Pennsylvania Lines West of Pittsburgh.—H. I. Miller has been appointed Superintendent of the Jefferson, Madison & Indianapolis Division, in place of W. F. Black, resigned. W. B. Leeds has been appointed Superintendent of the Southern Division of the Chicago, St. Louis & Pittsburgh, in place of H. I. Miller, transferred.

San Francisco & North Pacific.—The directors have elected J. F. Bergin President of the road, to succeed J. M. Donahue, deceased.

Sherman, Dennison & Dallas.—The incorporators of this Texas road are: B. P. McDonald, C. H. Olson, J. A. Taylor, E. P. Cowan, Dallas; T. Randolph, O. T. Lyon, T. D. Joiner, of Sherman; A. T. Drew and G. M. Jarvis, of Dennison.

Tilton & Franklin.—E. H. Woodman, of Concord, N. H., has been elected Treasurer of this road.

Toledo, St. Mary's & Cincinnati.—The charter of the company was filed in Ohio this week, the following being named as incorporators: Robert Gordon, Sr., Albert Althausen, Henry J. F. Metert, Frank Koehl, Sr., Frederick Dieker, David Armstrong, Christian Buehler, W. Bunel, David W. Jay, Ernst M. Venefflet, Guy Huffman and W. T. Money.

Valley (Ohio).—F. G. Benham having resigned, the position of Superintendent of Transportation has been abolished. W. J. Head has been appointed Train Master, and will have charge of the duties heretofore performed by the Superintendent of Transportation.

Wilmington Sea Coast.—The stockholders elected the following directors at a meeting in Wilmington, N. C., recently: E. S. Latimer, B. G. Worth, H. M. Bowden, H. G. Smith, W. H. Chadbourn, James H. Chadbourn, Jr., and George R. French. E. S. Latimer was re-elected President; B. G. Worth, Vice-President, and Capt. J. R. Nolan, General Manager, and also Secretary and Treasurer, H. M. Bowden having resigned the latter positions.

Wisconsin Central Co.—Charles L. Colby has resigned the presidency of the Wisconsin Central Co. and Wisconsin Central Railroad, and E. H. Abbot has been elected President and Treasurer of both corporations. Howard Morris, Assistant Secretary, has been elected Secretary to succeed Mr. Abbot, who was also Vice-President.

Henry F. Spencer, of Boston, has been chosen Assistant Secretary, and also director in place of Colgate Hoyt, of New York, who resigned from the directory.

OLD AND NEW ROADS.

Alton Terminal.—A mortgage on the property of the company to the St. Louis Trust Co., of St. Louis, has been recorded in Illinois. It is to secure the payment of 6 per cent. bonds amounting to \$50,000, running 10 years. Additional improvements and extensions are proposed and it is to secure funds for these that the bonds have been issued.

Augusta & West Florida.—The grading on this road has been in progress since Jan. 20, and about 10 miles have been completed near Augusta, Ga. The road is projected to Thomasville, a distance of about 230 miles.

Burksville & Northwestern.—The survey will begin next week for this road, recently incorporated in Kentucky. Two surveys will be run from Burksville, Cumberland County, northwest to points on the Louisville & Nashville; one to Glasgow, Barren County, and the other to Horse Cave, in Hart County. The length of the first line is 50 miles, and that of the latter 54 miles. The surveys will be completed in about six weeks, and then it will be decided which route to adopt. The road will reach a rich oil section and extensive timber lands. W. F. Alexander, of Burksville, is President.

Cairo & Kanawha.—The stockholders have authorized an issue of first-mortgage bonds to the amount of \$75,000, the amount of the capital stock. The road owned by H. S. Wilson & Sons, and completed for three miles from Cairo, W. Va., has been purchased. The company was recently incorporated and it proposes to build a road from Cairo to the south fork of Hughes River, and thence to Grantsville, Calhoun County, about 20 miles. The route is through fine timber lands.

Camden County.—An issue of \$100,000 five per cent. bonds has been authorized for building this extension of the Gloucester branch of the Atlantic City road from Mount Ephraim to Spring Mills, N. J., a distance of eight miles. The bonds are guaranteed by the Philadelphia & Reading.

Cincinnati & Atlantic.—This company has filed its charter in Tennessee to build a branch of the Knoxville Southern from a point on that road in McMinn County, northerly through McMinn, Loudon and Roane counties, to a connection with the Cincinnati Southern at Caney Creek, in Roane County.

Cincinnati & Southeastern.—A suit has been filed in the United States Circuit Court at Louisville, Ky., asking for a foreclosure sale of this road in favor of the first mortgage bond holders. The plaintiffs are Samuel Thomas and others, trustees, who hold bonds to the amount of \$61,130. The road extends from Johnson, on the Kentucky Central, to Hillsboro, Ky., 17 miles.

Cleveland, St. Louis & Kansas City.—Judgment for over \$88,000 was rendered last week at St. Charles, Mo., against the company, and in favor of the contractors who did the grading.

Cleveland & Western.—The company is now engaged in widening the banks of the road and doing other work, preparatory to changing the line to standard gauge from Delphos to Pandora, 23 miles. This road is now a part of the Pittsburgh, Akron & Western, which is to be built from Akron to Delphos, via either Carey or Findlay. John H. Sample, of Akron, O., is Chief Engineer.

Denver, Texas & Fort Worth.—The grading has been completed on the first 10 miles of the branch being built from Wichita Falls to Seymour, Tex., 30 miles. Track-laying will be begun on this section at once. Daniel Carey and John Hughes, both of Fort Worth, are the contractors.

Easton, Centerville & Chestertown.—This company has been organized with a capital stock of \$500,000 and has applied to the Maryland Legislature for a charter to build a road through Talbot, Queen Anne and Kent counties, in Maryland.

East Tennessee, Virginia & Georgia.—At the special stockholders' meeting to be held in Knoxville, Tenn., April 15, the following propositions will be voted upon: Of holding or disposing of the stock of the Memphis & Charleston, now owned by the East Tennessee, Virginia & Georgia; the purchasing, either alone or in conjunction with the Richmond & Danville, of stock in the Alabama Great Southern, the Cincinnati, New Orleans & Texas Pacific, and lines connecting with the Alabama Great Southern, and of other roads in the Southern States; the issuance of \$60,000,000 five per cent. 50-year gold bonds, secured by the shares and properties bought, either with or without the Richmond & Danville; to provide the necessary funds for the purchase of these stocks.

East & West of Alabama.—The Receiver has asked proposals for clearing and grading about 8,700 ft. of road in Polk County, Ga., comprising about 65,000 cubic yards of earth excavation. The work is to be done in connection with the changing of the road to standard gauge. Bids will be received until April 14. George H. Clark, of Cedartown, Ga., is Chief Engineer.

Empire & Dublin.—The location for the extension of this road from Hawkinsville, Ga., west about 15 miles, to a connection with the Georgia Southern & Florida, was commenced this week. The extension will probably be placed under contract as soon as the survey has been completed. R. S. Payne, of Atlanta, is Chief Engineer.

Eureka Springs.—At a meeting of stockholders last week a resolution was passed authorizing the directors to extend the road from the present terminus eastward to Harrison and the zinc mines in Boone County, a distance of about 50 miles.

Florida, Dawson & Northern.—This company has been recently organized in Georgia to build a road from Dawson, Ga., on the Columbus Southern, south to Tallahassee, Fla. It is expected that the survey will begin early next month. S. A. Ruggles, of Dawson, is General Manager.

Fort Worth & Albuquerque.—The grading which has been in progress near Fort Worth, Tex., for the past few weeks has been completed on the first three miles from that city. The work on the first six miles to the Trinity River is quite heavy, but beyond that point the grading is light to Springtown in Parker County, to which point the line is under contract. About 120 teams and scrapers and 200 men are working between Fort Worth and Trinity River.

Frankford Creek.—This company has been incorporated in Pennsylvania to build a road from a point on the Philadelphia & Trenton, between Erie avenue and Butler street, in the city of Philadelphia, to a point on Duncan street south of Pierce street, in the same city. The length of road will be about one and a quarter miles. The capital stock is \$100,000. J. N. Du Barry, of Philadelphia, is President.

Georgia Midland & Gulf.—The recent reports that this company would immediately extend its road from McDonough to Athens, Ga., are pronounced untrue by an officer of the road. Nothing definite has been done regarding the extension, and there are serious doubts of its ever being built. It certainly will not be constructed for several years. No surveys have been made.

Georgia Southern & Florida.—A report is circulated that this road will be extended from a point east of Melrose, via Rochelle and Micanopy, to Trenton, Alachua county, Fla., where large phosphate deposits have been found.

Georgia, Tennessee & Alabama.—Preliminary surveys are being made for this road, which was chartered by the last Georgia Legislature to build a road from Tallapoosa, Ga., on the Georgia Pacific, to Chattanooga. From Tallapoosa it will pass through an undeveloped timber region and through the iron ore and marble lands of northwest Georgia, thence north to Cave Springs, down Big Cedar Creek to the Coosa River, north to Pigeon Mountain and Chattanooga. From Tallapoosa it is proposed to build a southern extension to Wedowee, Ala., 35 miles distant. L. T. Berringer, of Ilion, N. Y., is Chief Engineer.

Glen Ellen & Los Guilicos.—The company has been incorporated in California to construct a road from Glen Ellen to Los Guilicos, Sonoma county, a distance of four miles. The directors are: A. P. Overton, of Santa Rosa; W. H. H. Graves, of Oakland, and N. W. Griswold, Will E. Fisher and Henry N. McChesney, of San Francisco. The capital stock is \$50,000, of which \$5,000 has been subscribed.

Greenville & Southeastern.—The directors have secured nearly all the right of way from Greenville, on the Louisville & Nashville southeast to Elba, Ala., a distance of 45 miles. It is claimed that as soon as all the right of way matters have been settled, the construction of the line will be commenced. Nearly the entire distance is through a thick pine forest.

Gulf, Brazos Valley & Pacific.—This company, which has previously been referred to, filed its articles of incorporation in Texas last week. The charter provides for a line 400 miles long from Velasco, at the mouth of the Brazos River, northwest through Waco to Henrietta near the Rio Grande River. The road will pass through the counties of Brazoria, Fort Bend, Austin, Washington, Milam, Falls, McLennan, Bosque, Hill, Somerville, Johnson, Hood, Palo Pinto, Jack and Clay. The capital stock is placed at \$500,000.

Guthrie, Reno City & Fort Reno.—The survey for this road was commenced this week at Guthrie, I. T., on the Atchison, Topeka & Santa Fe, and will be continued from that point southwest to Fort Reno, I. T., on the Chicago, Rock Island & Pacific, a distance of 42 miles. The grade will be easy, and it is expected to secure a nearly straight line. The survey will be finished in about 30 days. C. M. Keller, is Secretary, and C. J. Du Bois is Chief Engineer, both with office in Reno City, I. T.

Illinois Central Railroad Co.—The earnings from traffic for the eight months ending Feb. 28, 1890 and 1889 (February, 1890, estimated), were as follows:

	1890.	1889.	Inc. or Dec.
Aver. miles oper.....	2,275	2,033	I. 242
Gross earnings.....	\$10,083,404	\$8,595,840	I. \$1,487,564
Oper. expn. taxes.....	6,160,837	5,290,757	I. 870,080
Per. impr. paid from income.....	190,199	191,535	D. 1,339
Total.....	\$3,732,368	\$3,113,548	I. \$618,820
Net earnings.....	\$3,732,368	\$3,113,548	I. \$618,820

The Dubuque & Sioux City reports its gross and net earnings for the eight months ending Feb. 28, 1890 and 1889, as follows (February, 1890, estimated):

	D. & S. C. R. R.	C. F. & M.
Miles.....	1889-90. 524	1889-90. 524
Gross earn.....	\$1,213,300	\$1,217,946
Oper. exp. taxes.....	973,204	962,515
Net earnings.....	\$240,096	\$255,431

	Both roads.	Increase.
Miles.....	1889-90. 600	1889-90. 600
Gross earn.....	\$1,384,532	\$1,283,142
Oper. exp. taxes.....	1,076,849	1,038,984
Net earnings.....	\$307,683	\$244,248

The Dubuque & Sioux City expended on permanent improvements \$110,279, which was charged to capital account. The amount so spent and charged for corresponding period in 1889 was \$107,169.

Kanawha & Ohio.—Plans have been completed for the reorganization of this road, and the formation of a new company, which will be vested with the properties of the Kanawha & Ohio and of the Charleston & Ganley. Holders of over 950 out of 1,160 first mortgage bonds of the road have agreed to the plan, which is also open to the stockholders of the Kanawha Improvement Company. It is proposed to create 100-year gold bonds to the amount of \$15,000 per mile of single track road, but only \$10,000 per mile are to be issued for the purposes of reorganization, the remainder to be issued only for the extension of existing lines by purchase or construction. The stock will not exceed \$10,000,000. The plan will furnish \$855,000 in cash.

Kentucky Roads.—Bills have been introduced in the Kentucky Legislature to incorporate the following companies: Hartford & Fordville; Louisville, Covington & Cincinnati; Alabama & Manchester; Pineville, Mt. Pleasant & Big Stone Gap, with Attila Cox, W. T. Hall and others as incorporators; Corydon & Princeton; Lancaster, McKee & Middlesborough; Kentucky River and Virginia; and the Kinniconock & Freestone.

Kentucky Union.—The Court of Claims of Fayette County has given this company an extension until June 21, to complete its line between Winchester and Lexington, Ky., 20 miles, in order to earn the subscriptions voted by the county and city of Lexington. The line is nearly graded between these points, but the

recent floods have greatly retarded the completion of the section, and it was impossible to have it in operation by the time agreed upon when the subsidies were voted.

Knox & Lincoln.—The offer of Levi C. Wade, of Boston, to purchase this road for \$1,300,000 has been declined by the cities of Rockland and Bath and other towns along the road, who own the majority of the capital stock. They have appointed a committee to negotiate with those who desire to purchase the road and to arrange the sale if a higher offer is made.

Leavenworth & St. Joseph.—The survey is reported in progress between St. Joseph, Mo., and East Leavenworth, Mo., 33 miles, for this extension of the Chicago, St. Paul & Kansas City. The crossing over the Missouri River to Leavenworth, Kan., will probably be made by the Chicago, Rock Island & Pacific bridge. The work on the line is rather light. The maximum grades are one per cent, and the maximum curves are four degrees. No date has yet been decided for letting the contracts. Raymond Du Puy, of St. Paul, is President.

Lebanon & Reading.—This road has been incorporated in Pennsylvania by officers of the Pennsylvania Railroad to build over the route recently surveyed between Lebanon and Reading, 30 miles, parallel to the Philadelphia & Reading.

Speaking of the road, an officer of the Pennsylvania stated this week that the Pennsylvania had owned a charter for a similar road which had recently expired, and the new charter was to take the place of the one which had become useless. Surveys are now being made between Lebanon and Reading, but no route has yet been determined upon, and it is not definitely settled that a road will be built. It would be of advantage to the main line of the Pennsylvania because of the freight which it would obtain from the city of Reading and vicinity. The projected road would also be a feeder for the Schuylkill Valley division. The rumor that the Lehigh Valley will build to Reading is denied, and the officers of the Pennsylvania assert positively that a through traffic arrangement with the Lehigh Valley, between Harrisburg and New York, is not contemplated.

Lehigh Valley.—It is stated that this company has commenced the survey for a branch along the north side of the city of Allentown, Pa., to a point in the western section of the city, where a large freight station may be built.

Work on the tunnel between Pattenburg and West Portal, N. J., which has been going on for nearly two years, and which has cost about \$350,000, is about completed. The tunnel is seven-eighths of a mile long.

Long Island.—The company has accepted the proposal of the Brooklyn Rapid Transit Commission providing for the construction of a double track elevated road through the city on Atlantic avenue from South Ferry to Essex Street. From this point the road is to descend until the street level is reached at Kingston avenue. The company will be allowed to retain its surface tracks from Kingston and Montauk avenues to the city limits, 18 blocks. The elevated structure is not to be used for freight trains west of Flatbush avenue.

Louisville & Nashville.—The survey from Syllamanga, Ala., the terminus of the Anniston & Atlantic, has been completed to near Shelby, and it is stated that it will be continued from that point southwest to Selma.

Louisville Southeastern.—The National Contract & Construction Co., of which William H. C. McKinley, Harry Stucky and J. B. Camp are incorporators, has asked a charter from the Kentucky Legislature. The capital stock is placed at \$1,000,000. It has been organized to build this road, whose incorporation was recently noted, from Louisville southeast to Mount Washington, Ky., 20 miles, and to Smithville, 25 miles. Gen. W. B. Hope, of Louisville, is President.

Manistee & Grand Rapids.—It is expected that tracklaying will begin on this road as soon as the frost is out of the ground. The company has purchased 1,000 tons of rails. Grading was commenced Dec. 20 last, and a two-mile section is now completed. The work has been done by the company's own forces. On the first two miles 160,000 cubic yards of material were removed. The company was organized Nov. 26, 1889, to build a road from Manistee to Grand Rapids, Mich., a distance of about 110 miles. The object of the road is to furnish a new and independent outlet for the large lumber and salt product of Manistee, and to develop some extensive pines along the line. The preliminary survey has been made for 18 miles from Manistee south, and seven miles located. The work in the vicinity of Manistee is quite heavy, requiring several 8 degree and 10 degree curves. The maximum grades are one per cent, and there is a large amount of earthwork. E. W. Muenschler of Manistee is Chief Engineer.

Maryland Roads.—Bills have been passed in the Legislature authorizing the County Commissioners of Caroline, Dorchester, Talbot and Wicomico counties to subscribe to the capital stock of the Baltimore & Eastern Shore road; and extending the time for the consolidation of the Kent County road with the Smyrna & Delaware Bay road. Bills have been introduced to authorize the Commissioners of Caroline County, Md., to aid the Delaware & Chesapeake road in the construction of a branch through Caroline County, and to incorporate the Baltimore, Brooklyn & Cedar Hill and the Easton, Centreville & Chestertown.

Missouri Pacific.—Although a charter has been filed providing for certain branches and extension of the Kansas & Arkansas Valley division, no extensions of that road are contemplated for the present year, nor will any construction work be done on the Jefferson City, Booneville & Lexington branch from Booneville to Jefferson City, Mo. The Houston, Central Arkansas & Northern is under construction from McGehee, Ark., to Mer Rouge, La., a distance of 64 miles, and is expected to be completed between those points by May 1, 1890. Work is in progress on the Ft. Scott & Eastern from Ft. Scott, Kan., to Rich Hill, Mo., a distance of 24 miles; also on the Ft. Scott Belt Terminal road, comprising terminal tracks in the city of Ft. Scott, aggregating about four miles. The last two named branches will be completed by June 1, 1890. No other construction is in progress at this time on any of the lines of the system.

Missouri, Tennessee & Alabama.—The locating survey of this road is now in progress between Humboldt, Tenn., and Hopkinsville, Ky., 130 miles, under the Chief Engineer John B. Inman. E. P. Buell & Co., of Tarleton, O., who have the contract for the entire road, expect to have all sub-contracts let in about two weeks, when grading will probably be commenced.

Montana Central.—The grading on the Neirhart extension has been completed from Allen, near Great Falls, Mont., southeast to Monarch, a distance of 43 miles. It is expected to have tracklaying completed and the road opened between these points by April 20. The branch is to be continued from Monarch to the Little Blue Mountains, near Neirhart, about 11 miles beyond Monarch. Foley Brothers & Guthrie, of St. Paul, are the contractors.

Montreal & Ottawa.—The government engineer inspected the completed portion of this road, between Vaudreuil and Rigaud, P. Que., 15 miles, recently, and has prepared his report. Work is in progress on the bridge across the Ottawa River at Rigaud. It is 300 ft. long. The bridges to be erected at Plantagenet and Ottawa will be about 600 ft. long. J. M. Shanley, of Montreal, is Chief Engineer.

Morristown & Cumberland.—The town of Morristown, Tenn., is to hold an election on April 26, to vote on a proposition to subscribe \$50,000 to this road, which is to extend from Morristown to Cumberland Gap.

New Orleans & Northwestern.—Tracklaying is now in progress from Rayville, La., on the section between that point and the Tensas River, the end of track on the southern section. The grading is completed south from Rayville for 12 miles. A Harris tracklaying machine will soon be used on this section, when over a mile of track will be finished daily. The bridge over the Tensas River has been completed, and the grading has reached a point 12 miles from the river. It was expected to begin tracklaying on this section immediately, but the high water may interfere with the work. F. W. McCabe, of Vicksburg, Miss., has a contract for building bridges and trestles. The distance from Vidalia, opposite Natchez, Miss., to Rayville, on the Vicksburg, Shreveport & Pacific, is 71 miles. J. H. Watson has charge of the tracklaying.

New Roads.—E. P. Buell & Co., of Tarleton, Ohio, have just closed a contract for building about 100 miles of road in Ohio. The firm also has a contract to do the grading and tracklaying on 75 miles of road between Columbus and Floodwood, Ohio, to reach the coal fields in Hocking County.

Subscriptions have been voted at Fairfield and Wortham, Freestone County, Tex., to build a road between those points. The distance is about 10 miles, and connection is made at Wortham with the Houston & Texas Central. A proposition to extend the line about 10 miles further from Wortham to Corsicana is objected to on the ground that it would be too expensive. On the latter line there would be required about two miles of trestling over Richland Creek, three miles below the crossing with the Houston & Texas Central. It also proposed to extend the line south from Fairfield to connect with the International & Great Northern. James Garrity, Charles H. Allyn, A. Fox and H. G. Damon, of Corsicana, have agreed to subscribe for \$100,000 of the capital stock of the company to be organized, and have asked that a like amount of first mortgage bonds be taken by residents along the route.

New York, Schenectady & Ogdensburg.—At a meeting of citizens of Greenville, Ogdensburg, Cairo and Palenville, N. Y., held at Coeyman's Junction last week, this company was organized and directors elected. The proposed road is about 85 miles long, extending from Schenectady through Clarksville, Indian Fields and Greenville to Highland, Ulster County, where it will connect with the West Shore and the Poughkeepsie Bridge system. The capital stock is placed at \$30,000. W. H. Slingerland, Jr., of Albany, N. Y., is Chief Engineer.

Northeast Pennsylvania.—The stockholders last week voted to issue \$400,000 in five per cent. bonds, the proceeds to be used in building the extension from Hartsville to the Delaware River, at New Hope, Pa., a distance of 15 miles. The road is a branch of the Philadelphia & Reading, and that company will place the bonds.

Northern Pacific.—The branch between Gallatin and Butte, Mont., 70 miles, is now completed, with the exception of about 3½ miles, and the contractors expect to complete this section this or next week. Two large trestles have delayed the work very much, but they are now nearly finished. The extensions that have been decided upon for this season are from a point near Seattle north and the extension of the Northern Pacific & Cascade from its present terminus, Durham, Wash., to the Raging River mines, about 18 miles. Several other projects are under consideration.

North & South Short Line.—A company of this name has been surveying near Savannah, Ga., for a road through Effingham County for the last week or two. The engineers have completed the line to Guyton, about 20 miles northwest of Savannah. It is stated that the project is in the interest of the Florida Improvement & Construction Co. President Whaling, of Jacksonville, Fla., is securing right of way.

Northwestern Monroe.—This company has been organized in Ohio to build a line from Mansfield south to Lucas, about five miles.

Okanagan & Kootenai.—This company has been organized to build a road in British Columbia from a point near Sproat's Landing, thence north via the Lower Arrow Lake, through Fire Valley and Cherry Creek to Vernon. The capital stock is placed at \$500,000. Edward G. Prior, of Victoria, B. C., is one of the incorporators.

Old Colony.—The company has completed a survey for an extension of its Mattapan branch to connect with its Providence division, between the Hazlewood and Clarendon Hills stations. The branch will cross the New York & New England. It is expected to have the grading finished by Aug. 1.

Olympia & Chehalis Valley.—The company has made a proposition to build a standard gauge extension from its terminus at Tenino, Wash., on the Northern Pacific, to the coast, if the town of Olympia will raise \$100,000, grant free right of way through the town and land for shops, stations and other terminal facilities.

Oregon & Washington Territory.—The grading was begun last week on the extension from Walla Walla, Wash., south to Union, Or., a distance of nearly 120 miles.

The offer of the company to build the road between Centralia, on the Northern Pacific, and Gray's Harbor, in Western Washington, has been accepted, and subscriptions amounting to \$750,000 have been pledged the company by the following: Gray's Harbor Co., \$300,000; Aberdeen, \$13,000; Montesaro, \$65,000, and Centralia, \$300,000. The company has also agreed to extend its road

to Portland, Or. Its completed road is all in eastern Washington, and surveys have not been made for the proposed Western division.

Pacific Short Line.—The rails and other construction material which were attached last week have been released and tracklaying has been resumed in Dakota County, Neb. Officers of the line have stated to newspaper reporters that the contract for building the division between O'Neil, Neb., and Ogden, Utah, have been let to a St. Louis firm, but they modestly make no announcement concerning the likelihood of trains being run this year, which is hard on a patient and curious public who desire to have a seat on the first train, even though after that they may forget the name of the ambitious road.

Pennsylvania.—A second survey is being made for a short branch of the Schuylkill Valley division from a point near Reading to Mohrsville, Pa. The survey has been made by Ralph Shaner, of Pottstown.

Pennsylvania, Poughkeepsie & Boston.—At a meeting of the stockholders in Philadelphia last week it was voted to increase the capital stock from \$1,750,000 to \$2,000,000, and to issue \$500,000 of five per cent. 20-year second mortgage bonds. There is at present a first mortgage for \$1,500,000. The proceeds of the stock and bonds are to be used for completing the road and providing additional equipment.

Philadelphia & Reading.—The statement showing the earnings from traffic for the month of February, 1890, as compared with the same month last year is as follows:

Traffic.	1890.	1889.	Inc.
Gross receipts.....	\$1,313,632	\$1,161,161	\$152,471
Op. Expenses, ex. rent & int.	847,830	757,177	90,653
Net earnings.....	\$465,802	\$403,984	\$61,818
Profit from Dec. 1 to date.....	\$1,735,058	\$1,592,681	\$142,377

Port Townsend Southern.—An arrangement has been made by which the control of this company has been transferred to the Oregon Improvement Co., and that company will complete the line. The city of Port Townsend, Wash., has renewed a large land bonus and a cash subscription voted the old company. It is stated that the grading will begin in April.

Rhode Island Shore Line.—This is the name of the road referred to March 14 as building a branch of the New York, Providence & Boston between Wickford and Narragansett Pier, R. I. The company has not yet completed its plans for building, but will probably do so in two or three weeks. The road is projected to provide easy access to the different points on the shore.

Richmond & Danville.—It is stated that a survey is being made by this company across western North Carolina from Danville, Va., near the state line, to Gastonia, near Charlotte. This parallels at a distance of some miles the company's present line.

Richmond, Nicholasville, Irvine & Beattyville.—The bill to amend the charter of the company has passed the lower house of the Kentucky Legislature. The amendment authorizes an extension from Beattyville, through Owsley, Perry, Leslie, Letcher, Harlan, Bell and Knox counties to the Virginia line. It is provided that subscriptions may be voted to the road by any county through which it passes not exceeding the cost of the right of way and five cents on each \$100 of taxable property. Preliminary surveys have been made for the extension to the Virginia line and Southeast Kentucky.

Rockport, Langdon & Northern.—Charles T. Haines, of Rockport, Mo., has the contract for building this road in northwest Missouri, from Langdon, northeast to Rockport, a distance of six miles. R. Hunter is President, and J. D. Duff is Secretary, both of Rockport.

Rome.—The survey for the extension of this road from Kingston east, a distance of 25 miles, to Canton, Ga., is now in progress under R. S. Payne, of Atlanta, Ga., and will soon be completed.

St. Louis, Indianapolis & Eastern.—The company has filed a record in Indiana, a first mortgage for \$5,000,000, the proceeds to be used to build the road through Marion, Hendricks, Morgan, Putnam, Owen, Clay, Green and Sullivan counties and then to St. Louis.

Shenandoah Valley.—The chancery case of the Fidelity Insurance & Trust Co. was decided by the Supreme Court at Wheeling, W. Va., March 21. The opinion holds that the Central Improvement Co. is entitled to equitable compensation under the agreement of April 29, 1878, for the failure of the railroad to deliver the second mortgage and increase the bonds called for by the agreement, but this equitable compensation must be subject to the first mortgage bonds held by the Fidelity Co. as trustee to the amount of \$15,000 per mile "at 6 (not 7) per cent. per annum." The amount of compensation allowed the Central Improvement Co. is fixed by the face value of the bonds which were to be delivered to it under said agreement, as follows: \$250,000 with interest from April 1, 1879, subject to a credit of \$11,000, and a further sum of \$379,224, without interest. The first sum represents the second mortgage bonds, and the second sum of \$379,224 represents the increase bonds. What is known as "the Philadelphia record and attachment" was held no bar to recovery by the Central Improvement Co. except as an interest offset to the interest on the \$11,000 mentioned above. The judgment of the Circuit Court of Jefferson County was reversed throughout.

Sherman, Denison & Dallas.—This road has been chartered in Texas to construct a line from Denison through Sherman to Dallas, Tex., a distance of about 80 miles, passing through the counties of Grayson, Collin and Dallas. The capital stock is \$100,000.

South Georgia & Florida.—The survey for this road is expected to begin in about six weeks. It is to extend from Albany, south through Quitman, Ga., on the Savannah, Florida & Western, Madison, Fla., Hudson, on the Suwannee River road, Otter Creek, Citronelle, on the Silver Springs, Ocala & Gulf, Brooksville, on the Florida Southern, Seminole, on the Orange Belt, and thence to Tampa Harbor, on the west coast of Florida. The road connects with the Florida Central & Peninsular at Madison and at Otter Creek. Its total length will be about 251 miles, and the company claims that it will shorten the distance to Chattanooga, Tenn., 203 miles, and to Birmingham, Ala., 165 miles, as compared with existing lines. The route will be as nearly an air line as possible. Most of the right of way has been obtained, and very large grants of land and money have been made by the towns and counties through which the line

passes. Judge Joseph Tillman, of Quitman, is President, and W. H. McCall, of Quitman, and E. A. Shriver, of Columbus, are directors.

Temiscouata.—A special meeting of the stockholders will be held at Quebec, April 9, to vote on the question of issuing bonds to the amount of \$400,000 sterling upon the St. Francis branch, from the village of Edmundston to the mouth of the St. Francis River, about 35 miles, secured by a first mortgage on that branch.

Texas Western.—The statements that this narrow-gauge road is now controlled by the Missouri, Kansas & Texas have been recently renewed, apparently with some authority. The road extends from Houston west to Sealey, on the Atchison, Topeka & Santa Fe, 50 miles. The Missouri, Kansas & Texas has a branch completed from Bastrop east to Boggy Tank, a few miles west of Sealey. By completing the gap the latter line would have an entrance into Houston.

Toledo, St. Mary's & Cincinnati.—This company has been incorporated in Ohio to build a road between Toledo and Cincinnati, passing through the counties of Lucas, Wood, Henry, Putnam, Van Wert, Allen, Auglaize, Shelby, Darke, Miami, Montgomery, Preble, Butler and Hamilton.

Union Pacific.—The Kansas Central division of the St. Joseph & Grand Island, extending from Leavenworth west to Miltonvale, 165 miles, is to be changed to standard gauge. An agreement has been made with the Missouri Pacific by which the trains of the road will enter Kansas City over the tracks of the Missouri Pacific from Leavenworth. The latter road is to build a line from Union, Neb., north along the west bank of the Missouri River to Plattsmouth and thence to South Omaha, from which point it will enter Omaha over the tracks of the Union Pacific. This arrangement will give it a much more direct entrance to the city.

It is stated that the company is to build a branch from Kearney, Neb., northwest for a distance of 65 miles, from that point. The extension of the Cheyenne & Northern from its present terminus at Wendover north to a connection with the Fremont, Elkhorn & Missouri Valley, at or near Douglas, Wyo., is understood to have also been definitely decided upon.

Waco, Sabine & Trinity.—The scheme to build a road from Waco southeast to the Trinity River, near Trinity, Tex., on the International & Great Northern and a branch of the Missouri, Kansas & Texas, resulted in the organization of this company. The charter was recently formally filed. It provides for a route from Waco east through the counties of McLennan, Falls, Limestone, Freestone and Leon, thence southeast through Madison and Trinity.

Washington & Western.—Senator Barbour, of Virginia, has introduced a bill in the United States Senate granting the company permission to enter the District of Columbia and construct a bridge across the Potomac River at a point between the Chain bridge and Anacostia Island. The tracks are to extend along Water street to Rock Creek, and thence to Seventeenth and B streets northwest. The Virginia charter of the company gives it the right to construct a road from the Potomac River to the Shenandoah Valley road and thence to the state line.

Wheeling & Lake Erie.—A press dispatch states that the company has definitely decided to build the extension from Martin's Ferry through Belmont County, along the Ohio River, to Bellaire, below Wheeling, W. Va., about five miles. The hills run close to the river, and the branch will be very expensive to build. It is stated that it will cost \$200,000 to obtain the right of way, and \$252,000 to build the road.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, March 28.

The Missouri Pacific on the 22d announced a rate of \$7.50, first class, on passengers between Pueblo and Missouri River points. This action was followed by the other roads and that rate is now in effect from both Denver and Pueblo as well as the other Colorado points. The scalpers are understood to be reaping rich harvests and commission rates are said to be large. Meetings were held, however, to-day, which give hopeful indications of a restoration of rates. That of the general passenger agents of the roads formerly constituting the membership of the Western States Passenger Association was fully attended and harmonious. A resolution to the effect that the meeting knew of nothing to prevent immediate restoration was adopted, though the Chicago, Burlington & Quincy wanted assurance of "a reasonable degree of permanency for the agreed basis." The question of reorganizing the Western States Passenger Association was discussed, and a committee of five was appointed to consider this matter and prepare a report, with recommendations, to be submitted to an adjourned meeting to be held on Thursday. Probably the rules of the late Western States Passenger Association will be recommended for a temporary association, pending action of the Presidents next Wednesday. The Trans-Missouri Passenger Association met and also adjourned until to-morrow, waiting action by the other lines.

The Missouri Pacific has notified the Central Traffic Association that it will insert in its rate sheets from Missouri River points the differential passenger fares from St. Louis eastward. It will be remembered that the refusal of this company to take this action several weeks ago, when it was decided upon by the other roads, had the effect of nullifying the agreement of the Central Traffic roads not to pay commissions on eastbound passenger business. Whether the abolition of commissions will now be accomplished is, however, by no means certain, as the Chicago & Atlantic and other roads are paying commissions over a considerable territory.

The committee, consisting of Chairmen Walker, Fairborn, Midgley and Finley, appointed at the meeting of the presidents of the Interstate Commerce Railway Association, in New York, to prepare a plan of organization, have substantially completed their labors and have a new plan ready for submission to the lines. A meeting of the "Presidents, Vice-Presidents or General Managers" of all the lines of the various associations has been called for April 2, at Chicago, to hear the report. The meeting will be one of unusual interest.

Commissioners Morrison and Veazey returned to Chicago Monday, and yesterday held a session at the Palmer House, taking the testimony of several prominent railroad managers in regard to the present situation. The testimony which has been given before the Commission at various points in the West where they have

given hearings in regard to the transportation charges on food products, goes to show that the rates are lower than at any time since the passage of the law, and that the present low prices to the producer arise from over-production, rather than excessive rates of transportation. According to one report of a hearing in Nebraska, the farmers and shippers were conspicuous by their absence, and no complaint of exorbitant rates was made.

Traffic Notes.

The Iowa Legislature has before it a bill compelling railroads to make joint through rates with each other, apparently to any and all points, on demand of any shipper. There is also under consideration another bill giving the railroad commissioners authority to regulate passenger as well as freight rates.

A monthly steamer service is to be established between Portland, Or., and trans-Pacific ports "on behalf of" the Union Pacific. This road owns a considerable share in the Occidental & Oriental Steamship Co., whose ships sail from San Francisco, and there is, therefore, considerable speculation concerning the prospects of the new line. The name given as proprietor of it is F. Upton, of Kobe, Japan.

The New York, Ontario & Western has given notice that it will no longer receive corn billed through on the basis of 20 cents from Chicago to the seaboard. This rate gives that road only three mills per ton per mile, and as the company has all it can do in attending to its local traffic, much of which is ice paying one and one-half cents per ton per mile, the management very sensibly decides that hauling corn at less than cost is unprofitable business.

Rates on California Fruit.

The Transcontinental Association rules that after May 15 parties shipping seven car-loads of fruit, to start at the same place and time, to Missouri River, can have the same rate to Chicago or St. Louis, with the addition of a rate for expedition from the Missouri River to Chicago of fifty cents, and New York and Boston seventy cents. The consignor using the expedited train-service must consign the entire train to one consignee, though a part may be billed to an intermediate point and left there.

The Delaware & Hudson Canal will be opened for business on April 1, which is about a week later than the date of opening last year. The Albany and Newburg Line boats on the Hudson River began running on Monday last.

Cleveland Car Service Association.

Manager Simmons has issued his report for February. The following shows the number of cars handled, the percentage released within 48 hours and the average detention:

Road.	No. cars.	P. c. released within 48 hours.	Average detention.
Pennsylvania.....	6,833	76	2.03
Erie.....	5,629	73	2.23
Lake Shore.....	3,158	74	1.99
Valley.....	2,865	57	3.30
Big Four.....	3,518	70	2.20
Nickel Plate.....	1,033	70	2.75
C. A. & C.....	1,128	75	1.50
Cleveland & Canton.....	490	60	2.48
P. & W.....	38	60	3.00
Total.....	24,692	71	2.26

The earnings for February were \$3,292, the expenses \$2,136. The total earnings from Nov. 13, 1889, to Feb. 28, 1890, were \$13,938, of which \$8,722 has been collected and \$5,166 is uncollected. During this period the total number of cars handled under the rules of the association was 95,303. The average detention includes coal and coke on which 96 hours free time is allowed. On all other commodities the allowance of time from arrival is 48 hours. The average daily detention prior to organization was about 4.76 days on all track cars. Since the car service rules became effective it has been 2.29 days, a saving of 2.47 days per car. Valuing the lost time on all cars handled at 50 cents per day, the saving on 95,303 cars was \$117,600, or \$30,865 for February.

Anthracite Coal Tonnage.

The following is the statement of anthracite coal production for the month of February, 1890, as compared with the same period last year, compiled from returns furnished by the mine operators:

	Feb. 1890.	Feb. 1889.	Inc. or Dec.
From Wyoming region.....	954,813	1,096,683	D. 141,870
From Lehigh region.....	374,620	449,874	D. 75,254
From Schuylkill region.....	528,020	551,105	D. 23,085
Total.....	1,857,453	2,097,662	D. 240,209
	Year.		
From Wyoming region.....	2,036,066	2,413,417	D. 377,351
From Lehigh region.....	861,465	986,860	D. 125,394
From Schuylkill region.....	1,241,500	1,319,914	D. 78,415
Total.....	4,139,031	4,720,191	D. 581,160

The stock of coal on hand at tide-water shipping points, Feb. 28, 1890, was 1,148,379 tons; on Jan. 31, 1890, 1,138,927 tons; increase, 9,452 tons.

East-bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, March 22, amounted to 96,089 tons, against 90,364 tons during the preceding week, an increase of 5,725 tons, and against 55,696 tons during the corresponding week of 1889, an increase of 40,393 tons. The proportions carried by each road were:

	W'k to Mch. 22.		W'k to Mch. 15.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	12,195	12.7	10,938	12.1
Wabash.....	4,314	4.5	4,696	4.5
Lake Shore & Michigan South.....	17,676	18.4	17,933	19.9
Pitts., Ft. Wayne & Chicago.....	10,467	10.8	11,968	13.3
Chicago, St. Louis & Pitts.....	11,129	11.6	11,331	12.5
Baltimore & Ohio.....	11,410	11.9	13,104	14.5
Chicago & Grand Trunk.....	10,622	11.0	9,700	10.7
New York, Chic. & St. Louis.....	9,330	9.7	5,794	6.4
Chicago & Atlantic.....	9,016	9.4	5,489	6.1
Total.....	96,089	100.0	90,364	100.0

Of the above shipments 7,048 tons were flour, 50,907 tons grain, 1,954 tons millstuffs, 5,961 tons cured meats, 4,639 tons lard, 9,617 tons dressed beef, 1,424 tons butter, 1,481 tons hides, 339 tons wool and 6,064 tons lumber. The three Vanderbilt lines carried 40.8 per cent. of all the business, while the two Pennsylvania lines carried but 22.4 per cent.